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ADELPHI, LONDON.

101st SESSION, 1854-55.

CATALOGUE

OF THE

SEVENTH EXHIBITION OF INVENTIONS.

BEING A COLLECTION OF ARTICLES RECENTLY INVENTED, PATENTED, OR REGISTERED,
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SEVENTH EXHIBITION OF INVENTIONS.

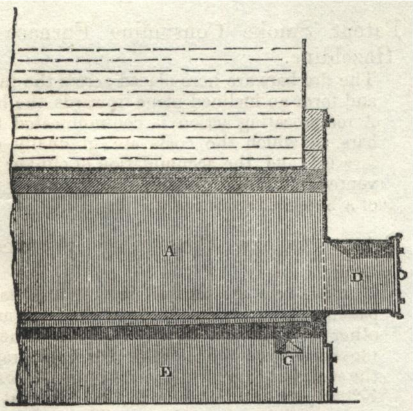
N.B.—The Council wish it to be particularly understood that they are not responsible for any of the statements contained in this Catalogue. They have to thank several of the Exhibitors for the loan of the wood blocks used to illustrate it. Where an asterisk (*) is prefixed to a number, it denotes that the article exhibited is a drawing.

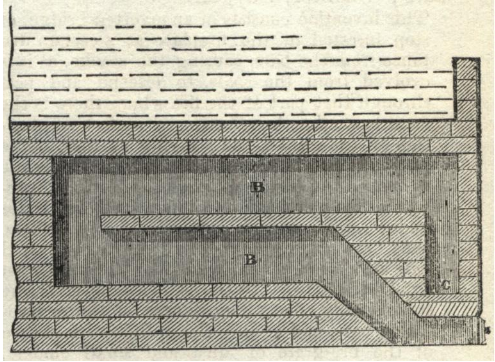
MOTIVE MACHINES, INCLUDING RAILWAY MECHANISM.

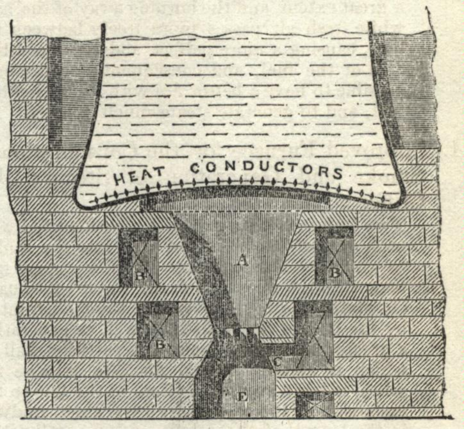
***1. Patent Smokeless Furnace and Stove; G. R. Booth.**

This invention consists of three chambers: the first of which is the fireplace or furnace; the second receives the smoke, gases, and products of combustion from the first, and in it they are mixed with such a quantity of air as to cause them to become inflamed; the resulting products of this chamber are then passed into the third, where a further mixing takes place.

***2. Patent Method of Economising Fuel and Preventing Smoke; Rev. W. R. Bowditch.**







A mouth-piece, similar to that used for gas-retorts, is fixed outside the furnace, forming a continuation of it outwards. Each charge of coal is placed in this, and becomes dried and heated before it is placed upon the fire. Fuliginous matter given off here is consumed by passing through the burning fuel behind; steam either escaping up the chimney as such, or possibly being in some measure decomposed and burnt. Hot coal deprived of its 10 per cent. of water will not give off smoke when placed upon a fire. Its gaseous constituents inflame almost instantly, and are given off more slowly. Side flues heat the air for combustion, and by delivering it, as shown, close to the ash-pit door (which is kept shut), a most vivid combustion is kept up at the point where the smoky matter, &c., given off by the drying fuel meets the fire. Two experiments have been tried with this apparatus, and the results obtained were as follows:—In the first instance, the work done was the same—viz., the distillation of gas. The existing furnace burnt per hour—Coal, 16lbs.; coke, 16lbs.: the improved, only—Coal, 9¼lbs.; coke, 8lbs. The second experiment was in the heating of water. The fuel was the same in both cases, but whereas the old furnace only raised the temperature from 40° Fahr. to 130° Fahr. = 90° Fahr., the improved furnace raised it from 30° Fahr. to 165° Fahr., = 135° Fahr. The heat conductors shown in the boiler are a series of connected pieces of metal, pointed at both ends, designed to save fuel by a more rapid abstraction of heat from the bottom of the boiler than can be effected by water. These are employed on the principle that heat and electricity are subjected to the same laws (which cannot, of course, be discussed here), and have shown a saving of from 16 to 18 per cent. when the heated surface was perfectly clean. They will probably act even more efficiently where furring takes place, and are about to be tested in a boiler occupied in pumping 20 hours per day.

3. Patent Smoke Consumer; — Simpson; and Patent Reciprocating and Moveable Fire-bars; Chanter, Day, and Co.

This invention consists of an inverted bridge, or stop, inserted in the fireplace at a certain distance from the bars, causing the smoke, as it is evolved from the coals, to descend and pass through that part of the fire where there is the most heat, thereby effecting a perfect combustion of the smoke, and a saving of fuel. The further improvements consist in the simple use of toothed or serrated bars with rockers, supported by brackets in tubular, and by boxes under round, waggon, and other shaped boilers, pans, &c. On the rockers, moving serrated bars are placed, so as to work alternately between fixed serrated bars. By the use of a hand-lever, the stoker easily effects a movement of the reciprocating bars, and at once cleans the entire surface of the fire-grate of dust and small cinders, thereby preventing the formation of clinkers to a great extent, and the burning away of the bars, while fresh air passes more freely between the bars, causing a more perfect and brisk combustion of the fuel, and consequently rendering it possible to have a better fire with a less depth of fuel, and to generate steam much quicker.

*4. Improved Furnace for the Consumption of Smoke and Generation of Steam; Joe Cliffe.

Two transverse copper boxes are connected with each side of the flues, and open into the boiler, to which are also connected hollow copper fire-bars, through all of which the water continually circulates, thereby preventing their destruction by the heat of the furnace, as well as generating a greater amount of steam. A partition wall (to which is affixed an iron door, to remove the ashes) is built from the bottom of the flue to the underside of the copper fire-bars, about midway in the length of the ashpit, and in conjunction with the copper fire-boxes at the back of the fire, which completely closes that part of the flue above the bars, thereby compelling the products of the fuel to descend through that portion of the fire on the bars behind this partition, thus consuming the fuliginous products of the fuel. A bridge is built, of the ordinary height, inside the flue, thereby concentrating the flame to the upper portion of the flue. An iron cistern, with a perforated bottom, is placed on the top of the flue, beyond the boiler. This cistern is continuously supplied with a chemical liquid, which, passing through the perforated bottom, completely absorbs the whole of the carbonic and other injurious gases, which are then discharged into a cesspool. A fan, to assist the draught, which might be impeded by the dropping of the liquid from the cistern, is placed just beyond it in the flue.

5. Patent for Admitting Air to Furnaces where Tubular Boilers are employed; R. Galloway.

6. Patents for Consuming the Smoke of Furnaces under the Boiler, and also for consuming the Effluvium arising from the Melting of Fat and Stuff, and in the boiling of Whalebone, Flesh, Bones, Oil, &c.; J. Gilbertson.

The first plan, patented by the inventor for consuming smoke, was in 1828; and consists essentially of hollow bars, and an air chamber under the bridge; the air passes through the bars into the chamber, and escaping thence by small orifices, mixes with the gases, causing them to inflame. The second plan, patented in 1854, is the application of a perforated tube, which carries air to all parts of the furnace, supplying it over the fuel equally. The consumption of the smoke commences with the first lighting of the fire, and from 20 to 25 per cent. of fuel is saved. The consumption of the effluvium is effected by the application of an ash pit door, a dome over the copper or pan, and a shaft from the dome to the ash pit. All access to the fire being stopped by the ash pit door, the draught must necessarily go down the shaft from under the dome, carrying the steam and noxious effluvium with the fresh air requisite to supply the fire.

7. Patent Smoke Consuming Furnace; W Hazeldine.

The fire bars are here placed across the furnace, and form an inclined plane towards the bridge. A reciprocating action is communicated to the bars, by which the coals are gradually driven forward, and the accumulation of clinker is prevented. The fuel is regularly supplied by means of a hopper, in front of the furnace.

8. Patent Smoke Consuming Furnace; J. Juckes.

The fire bars are formed into an endless chain passing over two drums, one at the front and the other at the back of the furnace. They are moved forward either by hand or by a strap from the steam engine; the power required is less than 1-20th part of a horse; and they travel at about the rate of six feet per hour. The coals pass into the furnace under the door, which lifts up instead of opening on hinges, and thereby forms a gauge for the fuel, so that the fire is level from one end to the other. With this invention, either large or small coals may be burnt advantageously, the latter admirably suiting the purpose. The air is constantly passing to the fuel through the fire bars, and in this manner perfect combustion is obtained. As the fuel is carried in under the fire door, so the scoria or clinker is carried out under the stop at the back of the furnace, and falls into an iron box or carriage on wheels. The burning away of the fire bars is prevented by their constant motion, being partially covered with unconsumed fuel, and getting cool before they re-enter the fire. The whole of the apparatus can be removed from under the boiler in case of need or repair, as it runs on rails. The entire consumption of the smoke is effected, with a considerable saving of fuel. (See *Journal of the Society of Arts*, vol. ii., page 33.

*9. Improvements in Boilers and other furnaces for the Prevention of Smoke; C. Hargrove.

This invention consists in making the fire bars of steam boiler and other furnaces hollow, and introducing air heated by passing through the said hollow bars, at the bridge or other suitable part of the furnace. The air heated by passing through the said hollow bars effects the prevention of smoke without the lowering of temperature which occurs when cold air is introduced for that purpose.

10. Patent Furnace Flues for the Consumption of Smoke and Saving of Fuel; B. Price and Co.

The principle consists of the admission of atmospheric air at the back of the ash-pit, or any other convenient place, the aperture being fitted with a door or valve, to which is attached a rod that comes to the mouth of the ash-pit, by this means the admission of the air may be regulated to any degree. Opposite the aperture is placed a tube which goes through the circulating chamber behind the bridge, to nearly the end of the boiler. It then branches off each way into two tubes, which return back to the bridge and deliver the heated air into a chamber, the top or outlet of which is made much smaller than the bottom. From this aperture there is a continual supply of heated oxygen brought in contact with the hydro-carbon (or black smoke) produced from the combustion of the coals in the furnace, and escaping unconsumed, for the want of more oxygen, into the flues, and thence to the top of the chimney. The tubes are placed in an elevated position, so as to cause the air to pass through them more rapidly into the small chamber (the receptacle of the heated air). There is also a large circulating chamber, where the different gases meet and get thoroughly mixed; this chamber is so constructed as to retard the velocity of the currents, which causes a more perfect combustion, and produces a more uniform heat round the boiler; the evaporation is much quicker, and the saving of fuel very considerable. In large boilers, there are two, and sometimes three of these circulating chambers.

11. Smoke Consuming Furnace; C. J. Redpath.

The idea of this furnace was partly derived from Mr. C. W. Williams's Argand Furnace. The air is introduced through the outer plate of the furnace door, which is perforated for the purpose, and it then passes upwards into an air-box above the fire, from which it descends in a heated state into the fire, causing the most perfect combustion of the fuel. Opposite the air-box before alluded to there is a valve, which can be opened and shut at pleasure, to admit air directly to the fire without passing between the plates of the furnace-door. When fresh coal is added to the fire, and a large quantity of air is required, this valve is opened; as soon as the charge has become ignited, the valve is closed. The cold air continually impinging on the inner plate of the furnace door, keeps both it and the ash-pit cool, which is a great consideration on board steam-vessels. It also prevents the rapid deterioration of the door. The furnace-bars are not more than three-quarters of an inch thick by six inches deep, and are placed half an inch apart; they are grooved on the top, thus making the set corrugated, offering a broken surface to the fuel, and thereby less inclination to clinker.

12. Patent Smoke-preventing Furnace, with moveable Chill Fire Bars; S. O. Regan.

The object of this invention is to give a regulated supply of rarefied air to the gases of combustion. Air is admitted through a chamber attached to the furnace door, as well as through the dead plate, which has slots in it for the purpose. The fire bars are of two kinds, waved on the upper surface, and grooved or plain, alternately; the former are moved longitudinally by means of a joggle shaft, and the latter transversely. This prevents the accumulation of clinkers and their adhesion to the bars, and keeps the air-way free, so necessary for the protection of the bars and the combustion of the gases. A slide or clinker plate, admitting the air in front of the bridge, is placed at the back of the furnace, between the bars and the hollow cast iron bridge. The bridge is protected by a casing of brickwork above the level of the fire-bars. In its front side, in the ash pit, there is a valve, and the back plate of the bridge is perforated.

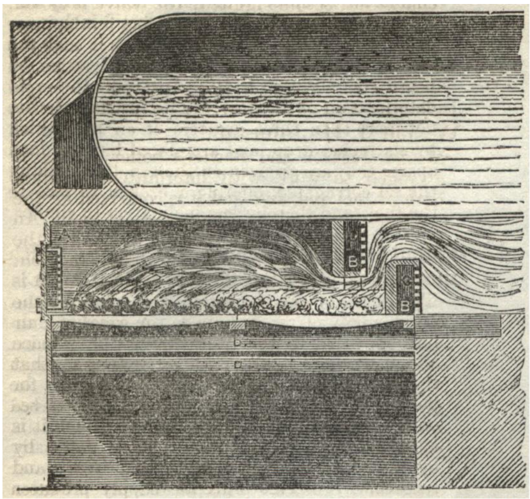
13. Patent Furnaces, for avoiding Smoke from Boilers, Coppers, Ovens, &c.; W. Sorrell.

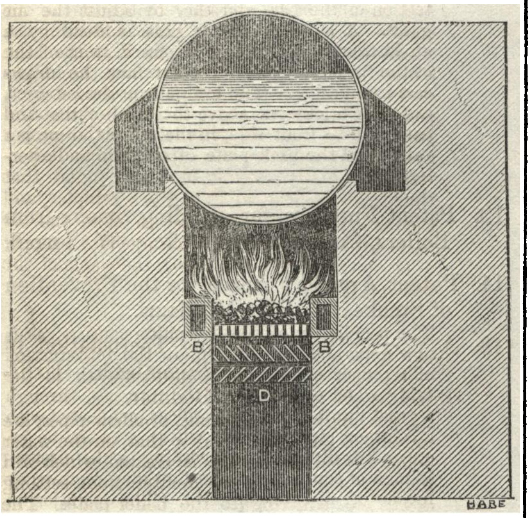
14. Patent Argand Furnace, for the Prevention of Smoke; C. Wye Williams.

The peculiarity of this invention consists, as is now generally well known, in the introduction of a proper quantity of atmospheric air to the bridges and flame beds of the furnaces, through a great number of small orifices, connected with a common pipe or canal, whose area can be increased or diminished, according as the circumstances of complete combustion may require, by means of an external valve. The operation of air thus entering in small jets into the half-burned carburetted gases over the fire and in the first flue is their perfect oxygenation, the development of all the heat which that can produce, and the entire prevention of smoke. (See C. W. Williams on "The Combustion of Coal, and the Prevention of Smoke;" 8vo, 2nd edition, London, 1854.)

*15. Patent Improvements in the Combustion of Fuel, and in the Construction of Furnaces; W. Woodcock.

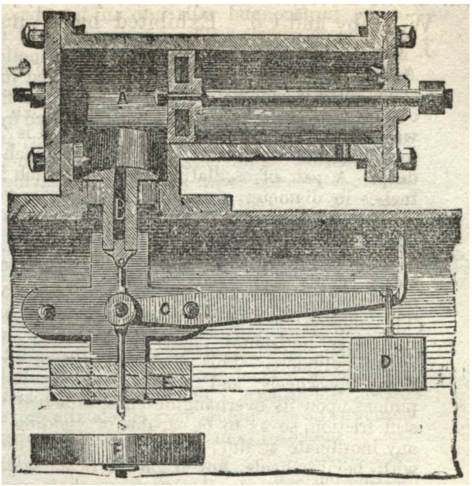
By the inventor's first patent heated air is supplied by pipes or flues, placed within the furnace, to the neighbourhood of the ordinary bridge, and, passing through numerous orifices into one common passage, with the gases given off by the fuel on the fire bars, is compelled by the peculiar position of an inverted bridge, to meet and combine with, and thus complete, the combustion of those gases. The hot-air flues, having their external opening at a greater distance from the shaft than the fire bars are, do not injure the draft to the latter, and require no valve or regulator, naturally supplying only the





quantity of air required by the gases in the different stages of their combustion. His second patent consists of a series of flat bars immediately beneath the fire bars, somewhat after the manner of Venetian blinds. By their aid the usual waste of heat passing into the ash pit is prevented, and the ash pit kept as cool as the external air; consequently the draught is materially increased, cool instead of hot air being supplied to the fire bars. Thus a more perfect combustion of the fuel is secured, and the fire bars are much protected. (See *Minutes of Proceedings of the Institution of Civil Engineers; Session* 1854-55.)

16. Patent Steam Fire Door and Damper Apparatus; S. J. Healey.



This invention consists essentially of a species of duplex valve, forming a means of communication between the interior of the boiler and a small cylinder and piston arranged to act upon fire doors or dampers, so as to diminish the action of the fire when necessary. A small steam cylinder, A, is fitted upon the top of the boiler, being connected to it by a short pipe cast upon it at one end. In this pipe is formed a seating for a valve, B, which opens upwards towards the cylinder, A. The valve B, has a tubular spindle passing down into the boiler, and to lateral pins on the lower end of this spindle, is hung a frame to receive the weights, E, which are adjusted to the area of the valve according to the highest pressure to which it is deemed advisable to raise the steam. Should the steam pressure increase beyond this amount, the valve B, is of course, raised, and the steam entering the cylinder, A, impels the piston towards its opposite end, thereby opening the fire door, or damper; the piston-rod being connected to one or the other as the case may be. The tubular opening in the valve, B, is fitted with a small valve at its lower end opening downwards, and this secondary valve is connected by a short link to a lever, C, carried by the frame hung upon the valve, B. The lever C, is weighted to D, to counterbalance a float F, connected to the inner end of the lever. It is intended to set this float not at the highest water level, but at a point below which it would be dangerous for the water level to be, so that if the supply of water, from any cause, fails to maintain the water level at the safety point, the float F, will descend and open the smaller valve, admitting the steam through the tubular passage in the valve, B, to the cylinder A, when it can act upon the piston, and through it upon the fire door or damper. There is an aperture in the cylinder near the end furthest from the valve B, and when the steam pressure is excessive, the piston passes beyond this aperture, and allows the steam to escape. The escape of steam as well as the movements of the details connected with the piston will attract the fireman's attention, and the apparatus will thus be an indicator of danger, as well as a self-acting safety appliance. (See the *Practical Mechanics' Journal*, February, 1855.)

*16*a*. Patent Steam Boiler; J. Warhurst.

Instead of the usual mode of producing steam by the direct action of fire upon water, it is proposed to economise the heat produced by fire in the first instance by confining the steam and passing it through pipes or tubes surrounded by water, causing the tubes so heated by the steam to cause the water to evaporate or produce more steam, thus economising the fuel.

*17*a*. Twin Dredger of 30 horses power; J. W. Hoby and Co. Exhibited by W. and J. H. Johnson.

A deviation from the ordinary system of construction was adopted in this dredger, to meet certain peculiarities in the locality for which it was built. The hull is of plate iron, and is 90 feet long, 30 feet wide, and 8 feet 6 inches deep. A pair of oscillating cylinders, each 25 inches in diameter, form the actuating power for the bucket chains. These cylinders are placed below the main driving shaft, which is at the upper end of the bucket ladders. The steam supply is derived from two boilers, one on each side of the central well of the hull. The motion is primarily communicated to a transverse horizontal shaft, directly over the steam cylinders. This shaft carries two very heavy fly-wheels, and it has, besides, bevil pinions upon its overhanging ends, attached by stiff friction, so as to be capable of yielding to any inordinate strain. These end pinions gear with bevil wheels keyed on vertical shafts, which again carry bevil pinions on their upper ends, in gear with large bevil wheels on the main driving shafts. Connections are also provided for enabling the engines to drive the several winches for lifting the lower ends of the bucket-ladders, and for warping the vessel into position. The machine has discharged at the rate of 1,840 tons per day of 10 hours.

*17*b*. Duplex Steam Boiler; J. H. Robinson. Exhibited by W. and J. H. Johnson.

This boiler is an attempt at the combination of narrow-diameter, and consequently safe boilers, with the greatest possible area of effective heating surface. It is composed of two separate cylindrical generators, disposed side by side, at a short distance apart. The fireplace is between, and partly beneath, these two chambers, and the draught currents, after passing between, and along the outside of the boilers, return by a central flue, or through a set of tubes, in each boiler. The two ends of the internal flue open laterally into an outside flue, which runs back to the chimney. The furnace may be large, so as to hold a great body of fire, which, besides demanding less attention than a small one, insures more perfect combustion, as the draught need be but weak.

*17*c*. Small Diameter Steam Boiler; Holcroft and Hoyle. Exhibited by W. and J. H. Johnson.

This is a triple chambered boiler, the three sections being disposed in a triangle. The large space thus enclosed forms the furnace, the direct heat from which is made to act upon large areas of the sides of two external cylinders, and the bottom of the central one. The fire current passes first right beneath the boiler, at the rear of which it is separated into two portions, passing to the after ends of the two side boilers. The flue tubes in these boilers form the return ways and so bring the currents to the front, from which part vertical flues take them down to a single central flue, underground, in communication with the chimney. The gain from the use of small diameters is shown in the fact, that a boiler, 4 feet in diameter, and made of $\frac{5}{16}$ plates, working at a pressure of 75 pounds, is subjected to no greater strain than a boiler 7 feet in diameter, made of $\frac{7}{16}$ plates, and working at 60 pounds. The new plan is also economical in space, a 60 horse boiler only requiring an area of 12 feet by 13 feet 6 inches.

*17*d*. Smokeless Steam Boiler Furnace; J. B. Jackson and W. Bowler. Exhibited by W. and J. H. Johnson.

Messrs. Jackson and Bowler's boiler furnace is arranged to work with intermittent supplies, both of fuel and air; and it is contrived for the prevention of smoke without waste of fuel. An air current is supplied behind the fire, just at the point where the furnace flame would languish. The effect of this supply is, that the flame is supported and carried on until the whole of the inflammable gas is consumed. A weighted air valve is fitted to the front end of the furnace seat, down in the ash-pit; and it is so set that it has a constant tendency to remain open for the admission of cold air. The air passes beneath an inclined heating plate, by which it is warmed, and it joins the furnace flame by emerging at a space between the primary and secondary bridges. This air supply produces complete combustion of the gaseous matters, but as the gaseous production varies with the fuel supply, it is necessary to adjust the air supply correspondingly. This is done by a "cataract" arrangement, set up in front of the boilers. When the attendant fires, he draws down one of the pendant rods of the cataract, thus opening the air valve to its full extent and putting the cataract cylinder into the proper position for retaining the valve open, and afterwards gradually closing it. It is found that the fire burns clear, in from 4 to 6 minutes, and the cataract is therefore set to close the air valve in that time. This plan provides a supply of air in exact accordance with the wants of the burning fuel.

*18. Apparatus for Preventing Incrustation in Steam Boilers; — Riggenbach. Exhibited by R. and L. R. Bodmer.

In this apparatus partitions, or elbow-pipes, are introduced into the boiler, so that, on the water being heated, a current is created which will prevent any extraneous matter from settling down and adhering to the boiler plates. The apparatus has been applied to compound boilers in France.

*19. Design for a pair of 200 horse Trunk Beam Engines, as arranged for driving a vessel with a screw-propeller; W. L. Baker.

By this arrangement the engines are rendered compact, and all their external and internal parts are easy of access, with, at the same time, the advantage of vertical cylinders. These engines, with tubular boilers, would weigh 500 tons, including water in the boilers.

*20. Design for a 6 horse high-pressure Beam Engine; W. L. Baker.

This engine is constructed on the same principle as the preceding one. The base of this engine measures only 4 ft. by 1 ft. 3½ inches, and its height is only 4 ft. 2½ inches to the top of the governor. Compactness and rigidity are thus obtained, and a speed of 100 strokes per minute.

***21*a*. Direct-Acting Screw-Propeller Marine Engines, of 400 horse power; H. W. Harman, C.E. Exhibited by W. and J. H. Johnson.**

Each cylinder has four piston rods, passing across the screw shaft line, and thence through the condensers on the port side of the ship, guide tubes being cast in the condensers as piston rod guides. From the cross heads on the piston rod ends, long connecting rods pass back to the cranks on the screw shaft, trunks being cast in the condensers for the play of the rods. The air pumps are disposed horizontally in the condensers, and their pistons are worked directly from the piston cross heads. The pumps are open at both ends, their surrounding chambers being valved for a double action. The slide valve motion is of the double eccentric link kind, the entire arrangement being under the control of a central hand gear wheel. The steam cylinders and condensers balance each other on the two sides of the keel line, and the whole of the parts are low down, and well out of the way of shot if arranged for war purposes.

***21*b*. Continuous-action Screw Purchase for Slips and Docks; J. Scott. Exhibited by W. and J. H. Johnson.**

By this contrivance ships may be drawn out of the water, and again let down therein, by an easy continuous movement. The essential feature of the traction apparatus, is a large compound, or right and left threaded screw, disposed in the line of ship carriage traverse. Each section of the screw has a massive nut crosshead, capable of traversing in parallel guides, in obedience to the revolution of the screw. From these nuts, rods pass down to traction hooks, which are capable of engaging and disengaging with the shoulders of the hauling chain links. A steam engine connected with the gearing at the head of the slip, affords the necessary actuating power, reversing apparatus being provided for giving the back and forward turns to the screw, as the nuts approach the ends of their traverse. This intermittent action of the screw, causes the two nuts to approach to, and recede from each other, alternately, and hence, each hauling hook alternately hauls and works free upon the carriage chain. The ship carriage is thus drawn steadily up the incline. The hauling chain is preserved in an unbroken condition by being wound upon a hexagonal drum, or rotatory holding frame. Each side of this drum corresponds to the length of a chain link, so that the chain points always exactly hit the angles of the drum, and in winding, the bends of the chain take place with great ease. The boss of the drum is formed with a nut to fit the screw threads on the stationary drum shaft, the pitch of the screw threads being made to agree with the space required for the chain coils. In this way, the chain always coils and uncoils upon the drum, in a uniform spiral. A slip, on this plan, has been made for an Australian harbour, by Messrs. Lawson and King, of Camlachie, Glasgow.

***21*c*. Duplex Screw Steering-Gear; Scott, Sinclair and Co. Exhibited by W. and J. H. Johnson.**

This double-screw arrangement has been contrived for communicating the motion of the steering wheel to the rudder, in such a manner as to secure a steady and effective action—whilst all " back lash " or counterstrain upon the steersman is avoided. The after end of the steering wheel spindle carries a spur wheel gearing, with two pinions on the respective ends of a pair of parallel screw spindles. These screw spindles are respectively right and left threaded—and each has a traversing nut fitted upon it—from which connecting rods pass to the two opposite ends of a double lever on the rudder spindle.

***21*d*. Screws for Marine Propulsion; Scott, Sinclair and Co. Exhibited by W. and J. H. Johnson.**

Figs. 1 and 2, side and back elevation of a steam ship, with a two bladed screw of the new form in position. Figs. 3 and 4 similar views, showing a screw as arranged for auxiliary purposes. Figs. 5 and 6 show a three-bladed screw in two stern views. Figs. 7 and 8 are detailed views of a similar screw to that represented in figs. 1 and 2; but composed of two sections, one of which can be shifted behind the other. In fig. 7 the screw is spread out to its propelling position, the two sections being brought so as to form continuations of each other. In fig. 8 the screw is supposed to be inert. Figs. 9 and 10 are views of a modified form of auxiliary propeller, in two different positions. Fig. 11 is a back elevation of another form of propeller for auxiliary purposes. The two pairs of blades assume positions at right angles with each other, being brought into a line with each other, when not propelling, as shown in side and back elevation, figs. 12 and 13. Messrs. Scott, Sinclair and Co. have fitted a three-bladed propeller of this form, to the *Ignez de Castro*, belonging to the Glasgow and Lisbon Screw Steam Packet Co.; and since that time it has been applied in several other instances.

***21*e*. Steam Hammer; R. Morrison. Exhibited by W. and J. H. Johnson.**

The essential improvement is the substitution for the hammer block piston and piston rod of the ordinary hammer, of a cylindrical wrought iron bar to form the acting hammer. The steam piston is forged upon the hammer bar, which projects out at the top of the cylinder, and has a T head to act as a guide for the bars traverse in the upper part of the framing. The steam cylinder over-hangs the standards, so as to leave the hammer quite clear for work, giving the workman very great facilities for operating upon his masses of iron.

22. Patent Screw Propellers; E. Hunt.

These screws are designed to obviate the defects arising from centrifugal action in the common screw. The outer and more effective portions of their blades are thrown considerably in advance, so as to act on more *solid* water in advance of that disturbed by the centrifugal action of the central part of the blades. The acting surface of the propeller, marked A, is a portion of a true helical or screw surface, precisely similar to that of a common screw, but instead of the blades being cut from the circumference straight down to the shaft on their leading and back edges, as in the common screw, these edges are gradually sloped backwards towards the shaft. The propellers, marked B and C, have the same peculiarity as the propeller A, but their acting surfaces have, in addition, a *backward* curve, so as to have a greater hold on the water; they are, however, true screws, and the two, B and C, merely differ as far as regards the curves of backward inclination of their acting surfaces. All the three propellers are of the same pitch and diameter.

22*a*. Patent Feathering Screws; J. Maudslay.

23. Patent Screw Propeller; the Phœnix Foundry Company, Lancaster.

The blade of this screw commences at a tangent to the boss, and is bent back spirally until it reaches about three-quarters of the entire radius; the curve then returns and terminates at right angles to the radius. This construction reduces the lateral resistance at the non-effective part of the blade, and gives great axial power at the effective or outermost part. It will carry an unusually large pitch with superior effect.

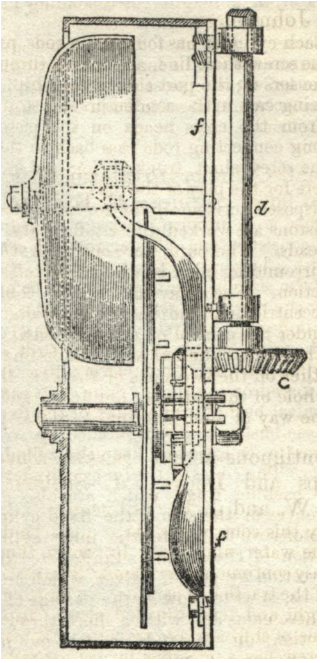
24. Improvements in Propelling Vessels; H. Walduck.

In screw propellers of the ordinary kind a considerable amount of power is wasted by the water being thrown off, partly by the impact of the blades spreading out the water laterally, and partly by centrifugal force. The invention is calculated to remedy this defect by making propellers with grooves on their propelling face, passing from the forward to the back edge of the blades, by which the water is prevented from escaping in a lateral direction, and the screw passes quietly through the water without creating any lateral commotion. These grooves vanish into an even cutting edge, which divides the water, while the back or hindermost edge is chamfered off into the plane of rotation. Three forms of blades are shown in the drawings annexed to the specification. 1st, a screw of the common shape, with the addition of the grooves; 2nd, a screw of a form somewhat like the letter S, which presents sharp entering points to the water; and 3rd, a screw of a conical form. In the first the grooves are of a semi-circular form, if viewed in section. In the last two forms the grooves form a series of curved steps, rising one above the other.

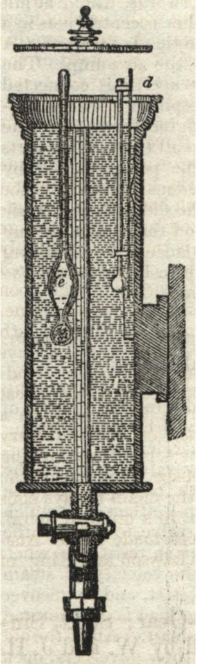
25. Oval Funnel for Steam Vessels; F. J. Wilson.

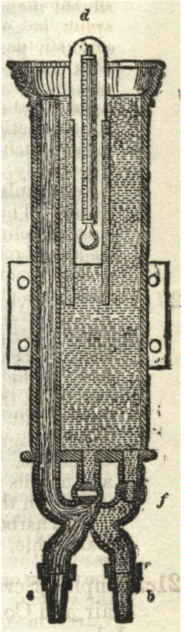
26. Engine-Room Telegraph; A. P. How.

At the captain's gangway a dial, *a*, is fixed horizontally on the top of a column of wood or cast iron, through which a spindle, *b*, is passed, having keyed on to its lower end a mitre cog-wheel, *c*, gearing into another similar wheel, which is keyed on the spindle to which the engineer's dial, *d*, is fixed. This dial, the alarum-bell, and other machinery are enclosed in a case or cover, the iron back-plate, *f*, being usually fixed to a bulkhead. In the dial, *d*, six pegs, *g*, are fixed, one between each signal; and attached to the spring of the alarum-hammer are two inclined planes, *h h*, each hinged on a pin at one end, and pressed against another pin, *i* (fixed in a projecting part of the hammer-spring), by means of a small spring, *k*. In the front of the cover, an aperture is cut large enough to exhibit the signal in full, but no more, so that only one signal is placed before the eye of the engineer. (See the *Artisan*, July, 1854.)



27. Patent Salinometer; A. P. How.





This instrument consists of a cylinder, or other shaped vessel, *a*, connected with the boiler by the pipe, *b*, the connection on the boiler being below the surface of the water. *f* is a stop-cock, to regulate the quantity of water admitted. It is generally fastened to some partition, bulkhead, or other suitable place, by a flange, and secured by screws. In the cylinder is a thermometer, *d.* *e* is a hydrometer, floating in the water, at a height corresponding to its density or saltness. *c* is an overflow pipe. The hydrometer is protected by a copper guard. This instrument can be located at any distance from the boiler; the most suitable place being in the engine-room, so as to be in constant view of the engineer.

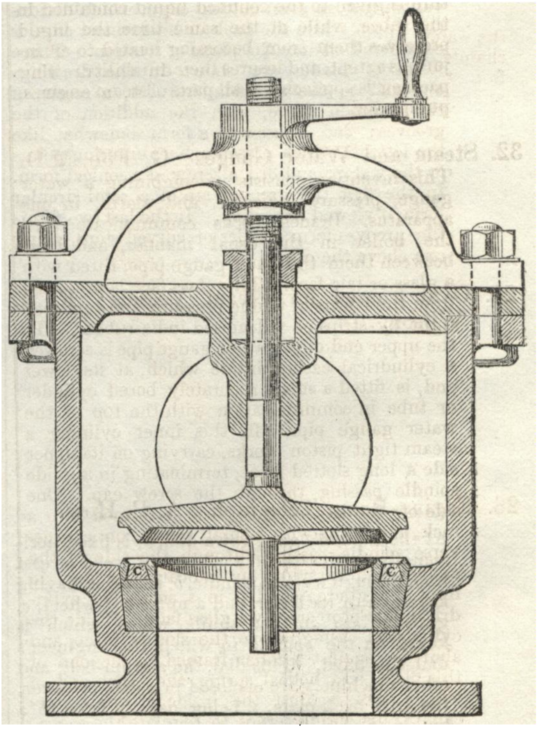
*28. Patent Cylinder to Steam, Air, or other fluid body Engines; E. F. Hutchins.

This is a uniform leverage or rotary engine. It consists of one cylinder, rotating concentrically with a larger and fixed cylinder, the difference of the sizes of the two cylinders being regulated by the required area of the pistons. The fixed cylinder has one side (or end) cast with it, the other side (or cover) is bolted to it. The inner cylinder is cast in one piece with a wheel, which is keyed on the shaft. The shaft passes through conical bushes in the sides of the fixed cylinder, these bushes can be tightened up so as to compensate for wear and keep the cylinders concentric. The edges of the inner cylinder are ground to packing rings, which are also ground into grooves in the side of the fixed cylinder. The pistons are bolted to the inner cylinder. The action of the steam is limited to the required direction by cut off valves, which are raised by cams, so as to allow for the passage of the pistons, These cams act, with a short throw and a slow motion, on the rods, which by means of a lever transmit a quick motion to the valves, thus saving wear in the working parts. An eccentric with two brasses, works two slide valves, one backwards and the other forwards, which admit and cut off the steam, another eccentric acts in a similar manner when the engine is reversed. A crank, or eccentric, works the air pump. The eduction ports are simply apertures connected with the condenser or atmosphere. The advantages over other rotary engines are—1st. The equality of wear arises from all the wearing parts being concentric. 2nd. The power gained by being able to use the condenser especially for marine purposes. 3rd. The slide valve eccentric motion allows for cutting off the steam at any given point. 4th. The balance of forces arising from the pressure of the steam being always the same on each side of the shaft.

29. Patent Governors and Valves; — Judson. Exhibited by Nourse and Co.

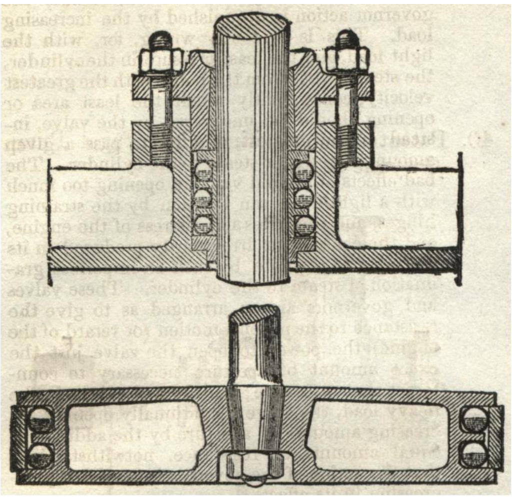
This improvement consists in making regulating valves to open with a rapidly increasing ratio of opening by increasing the width of the opening made in the valve, or by accelerating the opening motion of the ordinary valves in use, or by combining increased width of opening with accelerated valve motion—either of which arrangements compels the valve to uncover the *least* opening (by adding a given resistance) when the load is lightest and the velocity of steam passing the aperture is greatest, and to uncover the *largest* opening when the load is greatest and the velocity of steam is the least. All of the old valves, in connection with their governors, open areas directly the reverse; for, as the retard or check of the engine caused by adding resistance determines the amount of opening made by the valve, it follows that, when the engine is lightly loaded, the opening of the valve is greatest, because the check or retard is then greatest (when a given resistance is added to the load); and as the load increases, the opening made by the valve is continually less and less, because the governor action is diminished by the increasing load. This is evidently wrong, for, with the light load, and the least pressure in the cylinder, the steam passes from the boiler with the greatest velocity, consequently much the least area or opening should be uncovered by the valve, instead of the greatest, in order to pass a given amount of power or steam to the cylinder. The bad effects of the old valve in opening too much with a light load can be seen by the straining hinges, and the stress and distress of the engine, and the consequent irregularity produced in its attempts to regulate by such an imperfect graduation of steam to the cylinder. These valves and governors are so arranged as to give the resistance to the piston's motion (or retard of the engine) the power to open the valve just the exact amount of aperture necessary to counteract that resistance; and from the light to the heavy load, the valve is continually opening increasing amounts of aperture by the addition of equal amounts of resistance, notwithstanding that the action of the governor is continually decreasing in its effects.

30. Patent Valve Seating; — Gregory. Exhibited by A. P. How.



Round the underside of this valve is cast an angular projection, and in the valve seating is cast a recess, which contains a ring of India-rubber, C C. On the valve descending, this ring is compressed by the angular projection on the valve, thus rendering it perfectly secure from leakage.

*31. Patent Tubular Packing; Gregory and How.



This packing consists of vulcanised india-rubber tubing, partially filled with liquid, and protected by metallic surfaces, so as to increase its durability. The elasticity of the packing is increased by the additional pressure of the steam. By the increase of pressure an increase of temperature is given to the confined liquid contained in the tubes, while at the same time the liquid preserves them from becoming heated to an injurious extent, and insures their durability. This packing is applicable to all parts of steam engines, pumps, &c.

32. Steam and Water Gauges; G. Fife, M.D.

This invention consists in combining a water gauge, pressure indicator, and alarm, in one apparatus. Branch cocks communicate with the boiler in the usual manner, and have between them the water gauge pipe, fitted with a glass or talc face. This glass face is protected from the effects of undue pressure, and rendered tight by strips of vulcanised india-rubber. To the upper end of the water gauge pipe is screwed a cylindrical casing, inside which, at its lower end, is fitted a small accurately bored cylinder or tube in communication with the top of the water gauge pipe. In this inner cylinder a steam tight piston works, carrying on its upper side a long slotted piece, terminating in a guide spindle passing through the screw cap. One side of the slot in this piece is formed into a rack, and gears with a small pinion, on a transverse spindle, passing through the side of the casing, and carrying an indicating finger, in front of a graduated dial in a small flat cylindrical case protected by a glass face. Inside the cylindrical casing, above the slotted piece, and abutting against a collar framed on the end of this piece, is a helical spring, the other end of which abuts against the inside of the screw-cap. This spring serves to regulate the movement of the piston, and causes it to descend on a decrease of the pressure acting on the under surface of the piston. It is obvious that by means of the rack and pinion, the pressure will always be accurately indicated on the graduated dial. Should the pressure become too great, the consequent rising of the piston will uncover a lateral outlet in the cylinder opposite the tube, which communicates with the alarm whistle; and, in consequence, the steam will rush through and sound this whistle, thereby calling attention to the state of the boiler. A small pipe and stop cock are fitted to the lower end of the water gauge pipe, for blowing off and clearing the pipes.—(See *Practical Mechanics' Journal*, July, 1853,)

33. Patent High Pressure Tap; D. Barr.

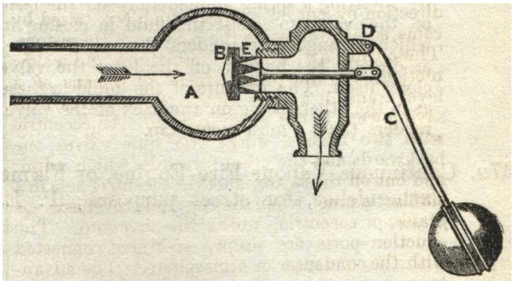
34. Self-closing Cock, or Waste Water Preventer; T. Culpin.

35. Patent Self-closing Lever Tap, applicable either to bib, ball, stop, or beer cocks; G. Davis.

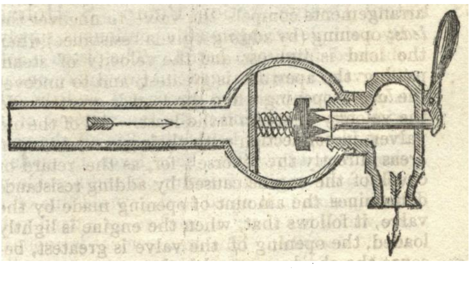
36. Compound Filtering and Non-Filtering Tap; — Ryan. Exhibited by Campin and Co.

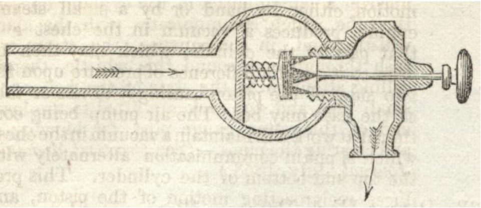
A globular vessel of glass is filled with sponge, charcoal, &c., and constitutes a filtering chamber, through which the water is either passed or not at pleasure.

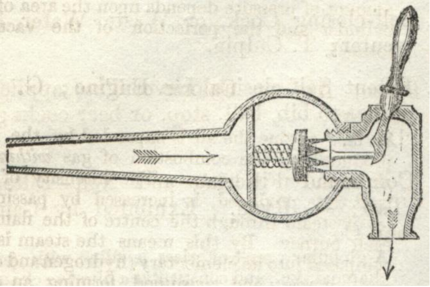
37. Patent Safety Taps; Sudbury, Wright and Co.



The barrel of this tap has a globular swell, in which a valve with a regulating plug is placed. The other part of the barrel is screwed on, and forms the valve seat. To the valve a horizontal rod is attached, and projects through the side of the exit chamber where it is jointed to the ball lever which is mounted on a fixed fulcrum outside the tap. The valve is faced with cork, to render it water-tight. The regulating plug has V-shaped grooves, which prevent the too sudden shutting off of the liquid. On the falling of the ball in the cistern, the lever presses on the horizontal rod, and forces the valve into the globe of the barrel, and the liquid immediately flows through the grooves of the regulating plug. When the ball rises with the water it closes the valve, and the pressure of the liquid being on the back of the valve, the greater the pressure the







more secure the tap. The hand-taps are similarly constructed, with the exception of a hand lever instead of the ball; and are so formed that pressure shall exist on both sides of the valve, by inserting a spring immediately on the back of the valve to assist the fluid in closing it, which arrangement renders them self-acting, as directly the hand is off the lever the valve closes itself. The pressure of the liquid in these as in the others being on the back of the valve, renders them a most secure tap.

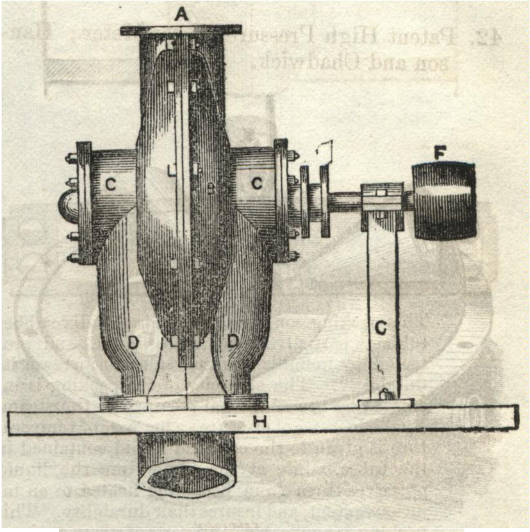
37*a*. Continuous Vapour Fire-Engine, or Flame Extinguisher, for street purposes; T. E. Moore.

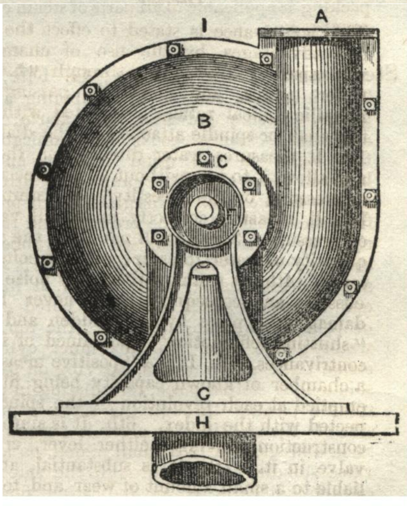
38. Patent Double-Action Pump; S. Holman.

By a simple arrangement a continuous supply is obtained from one barrel. The piston is solid. The valves are arranged in two pairs; one pair is connected with the upper end, and the other with the lower end. By the removal of the front plate, access is permitted to all the valves simultaneously. The hand-lever is made to vibrate on a fixed fulcrum-pin and a guide-pin, having slots in it equal to the versed line of the arc which the lever, if worked on a fixed point, would describe. This arrangement is applicable to the guiding of reciprocating rods generally.

39. Improved Pump, for raising or forcing water out of mines; T. Griffiths.

40. Patent Double-acting Centrifugal Pump; Gwynne & Co.



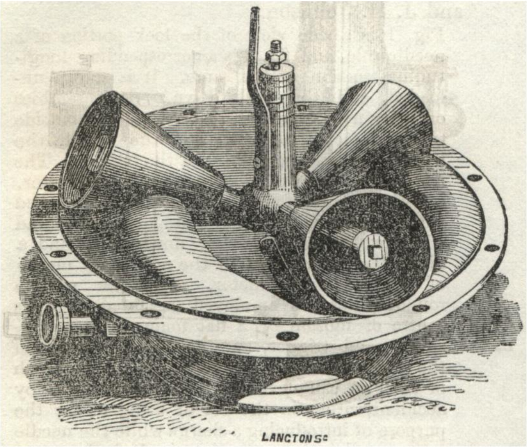


No. 3 pump, capable of raising one ton of water, or other liquid, per minute. No. 1 pump capable of raising 30 gallons, or 300 lbs. weight, per minute. In the annexed wood-cuts (one of which is a side and the other an end view), upon the flange, A A, the discharge pipe is bolted, and may be carried up to any required height; B B is the case or receiver of the pump, inside of which a wheel or piston (made fast upon the spindle) revolves. Motion is communicated to it from the pulley F; C D, C D are the water passages, which converge into one pipe, on the bed-plate *h*, and which pipe communicates with the liquid to be raised.

41. Patent Submersion Gravity Force Pump; J. Wilson.

41*a*. Patent Water Ballast, Pumps, and Stowage Bags; D. B. White, *M.D.*

42. Patent High Pressure Water Meter; Hanson and Chadwick.



This contrivance is stated to effect the following advantages by the use of chambers of vulcanised india-rubber, through which the water passes, and moves, in passing, three metallic conical rollers, connected with a central shaft or spindle attached to the dial works. 1st. It measures water direct from the pipes, and allows it to pass without any appreciable loss of pressure, or the necessity of a cistern. 2nd. It will measure correctly under all variations of pressure. 3rd. It will not allow the smallest quantity of water to escape without being registered. 4th. It works without any noise or concussion, and consequently can never burst or damage the pipes by the sudden and violent "shutting off motion" complained of in other contrivances. 5th. It is a "positive measurer"—a chamber of known capacity being filled and emptied at each revolution of the spindle connected with the index. 6th. It is simple in its construction, having neither lever, crank, or valve in it. 7th. It is substantial, and only liable to a small amount of wear and tear; and its durability will, if required, be guaranteed for ten years. (See *Journal of the Society of Arts*, Vol. II., p. 384. Also, *Minutes of Proceedings of the Inst. of Civil Engineers*, for Session 1853-4.")

*43. Patent Pneumatic Apparatus for obtaining and transmitting motive power; J. C. Purnelle.

This apparatus consists of an engine (1), a regulating vacuum-chest (2), and a powerful double-acting air pump (3). The engine is constructed somewhat similarly to the steam-engine, with a cylinder provided with valves, which open and close it alternately to the atmosphere and to the air pump. The air pump being put in motion, either by hand or by a small steam-engine, produces a vacuum in the chest and that part of the cylinder which may then be open to it—and a difference of pressure upon the two sides of the piston causing it to rise or fall, as the case may be. The air pump being continued at work will maintain a vacuum in the chest, which is put in communication alternately with the top and bottom of the cylinder. This produces reciprocating motion of the piston, and rotatory motion of the driving shaft. The amount of pressure depends upon the area of the cylinder and the perfection of the vacuum formed.

*44. Patent Air or Caloric Engine; G. W. Kelsey.

In this engine the air is expanded by the heat produced by the combustion of gas *within* the air chamber or heater. The intensity of the heat thus produced, is increased by passing a jet of steam through the centre of the flame of each burner. By this means the steam is decomposed into its elementary (hydrogen and oxygen) gases, and consumed, forming an oxy-hydrogen blow-pipe. This engine requires no chimney, no coals, or coke, and it may almost be said no water, and is consequently very light. It is economical in three respects, 1st. in fuel, because the whole of the heat generated is made available; 2nd. in space, as, instead of having one large heater, there may be as many smaller ones as there are gas burners, and then they may be arranged as conveniently as the pipes of an organ; 3rd. in wear, as by placing the flame at a proper distance from the top of the air chamber, it cannot destroy it by burning it out.

*45*a*. The "Little England" Locomotive; G. England and Co. Exhibited by W. and J. H. Johnson.

This is a six-wheel tank engine; it has a pair of driving wheels 4ft. 6in. in diameter, with 3ft. leading wheels, and trailing wheels of the same size beneath the tank, or miniature tender, which is combined with the engine frame. This engine has given very good results as regards economy of fuel, and the builders affirm that it is equal to the task of running six first-class carriages at 60 miles per hour.

*45*b*. Reaction-Balance Water-Meter; T. Kennedy. Exhibited by W. & J. H. Johnson.

Fig. 1. is a vertical section of the meter case, shewing the measuring apparatus in elevation within. Fig. 2 is a vertical section of the adjustable water-valve, detached, and drawn to a scale of one-fourth the real size. Fig. 3 is a corresponding section of the external cylinder of the valve with its internal slotted waterway in elevation; and fig. 4 is a half size side view of the indicating mechanism and the clockwork or continuous mover, as detached from the valves. The fluid to be measured is passed through an adjustable valve, working in connection with an arrangement of clockwork. The valve on the supply pipe consists of a small bored cylinder, fitted with a piston, and having a narrow longitudinal slot on one side. The water being admitted to this cylinder beneath the piston, escapes through this slot into an outer cylinder, communicating with the service pipe or delivering stop-cock. When placed vertically, the piston rod is loaded with a weight, to keep it steady upon the water, the rod being passed through a stuffing box at the top of the outer cylinder, above which it is connected to a traversing pulley, which is kept constantly revolving by contact with a cone pulley driven at a continuous uniform rate by a common clock movement. The result of this combination is, that as the piston rises in its cylinder, admitting an increased flow of water, it draws the traversing pulley towards the larger end of the cone; and this pulley being connected to the indicating mechanism, at once points out the quantity of water passing through, as it is driven at a more or less increased speed from its position nearer to, or further from, the large end of the cone. Fig. 5 is a vertical section of another valve which may be employed, consisting of a conical barrel or chamber having within it a conical piston or plunger, the diameter of which is such as to fit the smaller end of the barrel. This piston is carried on a vertical rod, which is connected to an indicating apparatus in the manner already described. Fig. 6 exhibits another modification of indicating apparatus, in which a horizontal disc is substituted for the cone. As the rise or fall of the valve piston traverses the indicator near to, or farther from, the periphery of the disc, the dial indications shew a greater or less rate. Fig. 7 is a side elevation of an adjustable balance or pendulum action applied to the clock movement, and arranged so that the valve adjusts the clock's rate of going, and makes it go quicker or slower, in obedience to the position of the piston in its cylinder and the quantity of water passed through, this quantity being read off from the dial of the clock itself, which indicates a greater or less quantity accordingly as it may have been driven at a quick or slow rate for a greater or less period.

*45*c*. Patent Balance Water Meter, with Helical Blades, to work under Pressure; C. W. Siemens.

In this meter the water enters through a grating, and spreads over a conical block. It then passes to drums geared together, but free to revolve in opposite directions—the first drum being armed on its circumference with a set of right-handed, and the second with a set of left-handed screw vanes. The motion of the drums is communicated to an upright spindle, working in a chamber where the motion is reduced several thousand times, after which it passed into the counter chamber. (See *Journal of Society of Arts*, vol. ii., page 385.)

*45*d*. Coal-whipping Engine; F. H. Trevithick. Exhibited by W. and J. H. Johnson.

This engine is portable, and is arranged to stand on the deck of the collier the cargo of which it is to discharge. The actuating engine is of the simplest construction, its steam cylinder being six inches in diameter, with a stroke of 16 inches. A forked connecting rod passes directly upwards to the overhead crank, fast on the horizontal winding shaft, carried on a pair of short brackets surmounting the top of the vertical boiler. This shaft carries a winding barrel with a small overhung fly-wheel fitted with a friction brake at its opposite end. The boiler, which is of the vertical tubular kind, is contrived to answer as a pillar for the winding apratus. It is a plain cylinder, with an inside fire-box, from the convex top of which spring the tubes, 73 in number, and $1\frac{3}{8}$ inches in outside diameter, opening at their upper ends into a shallow smoke-box, whence the flue current passes into the chimney, standing up about six feet above the top of the boiler. The engineer is so placed as to be enabled to see the position of the bucket which is being hoisted, and with the reversing handle in one hand, and the brake lever in the other, he has the most perfect control over his machine. The quantity of coal lifted at once is 5 cwt., the bucket chain being passed over a derrick in the usual manner, and then wound on the barrel of the machine.

*45*e*. Prussian Needle Gun and Repeating Pistol; Dr. Kufahl. Exhibited by W. and J. H. Johnson.

Fig. 1 is a side view of the lock portion of a needle rifle, and fig. 2 is a corresponding longitudinal section of the same. It is shown unloaded, and the cock down. It resembles ordinary needle guns as far as regards the outside tube or socket screwed into the barrel, the needle, the needle guide, and the handle. The needle is screwed into a needle-conductor, carrying at its fore-part a piston well packed with an elastic material, and provided behind with two studs projecting downwards, and a disc. To give motion to the needle, by means of the needle-conductor, a tumbler with a rounded head is employed, actuated near its centre of motion by a flat mainspring, a sear-spring, and trigger, and connected outside of the gunstock with a cocking lever. The breech of the gun can never be opened wilfully or by accident, either in the act of firing or for the purpose of introducing a charge while the needle is protruding into the interior of the gun. While loading the tumbler is out of all connection with the needle conductor. This gun is thus much safer in handling than any other, it being impossible to open the breech for loading or any other purpose, or for it to fly open of its own accord, as long as the tumbler, mainspring, and trigger have any communication with, or power of action on the needle. Fig. 3 is a side view, and fig. 4 a longitudinal section, showing the application of the improvements to a repeating needle pistol. The outside tube, or socket, is provided at the top of its foremost part with a longitudinal and a transverse slot, for the reception of the knob or handle of the inner tube. The lower part of the outside tube forms a rectangular box for the reception of the tumbler, the mainspring, the sear, and those parts by which the disc containing the charges is made to revolve. The means of preventing the escape of gas, namely, the packed piston of the needle conductor, and the thin metal tubes of the chambers, are the same as employed in the gun. A strong horizontal bolt is made use of to bring the fore-part of the tube into the barrel and keep it steady whilst the explosion takes place. This bolt is always in contact with the disc at one end, and with an enlarged part of the tumbler at the other. Whilst the pistol is at half or full cock, the disc and the bolt are kept back by the action of a spring, situated between the disc and barrel, and the metal tubes are clear of the latter; but as soon as the trigger is released the prominent curve of the tumbler forces the bolt and disc forward, pushes the metal tube into the barrel, and firmly shuts the joint before the needle can reach the priming to explode the charge.

*46. Patent Coupling and Uncoupling Gear for Railway Carriages and Rolling Stock; Taylor and Cranstoun. Exhibited by W. and J. H. Johnson.

These improvements are especially designed to obviate all accidents arising from the necessity of having to pass between the buffers whilst coupling or uncoupling, as with the arrangements ordinarily in use. They are in practical operation on the Morayshire Railway. Each carriage or waggon, in addition to a central hook as a draw-link, has attached to it three hinged chain links, capable of being raised or lowered at pleasure. These links are made with a central back stop joint, in such manner, that whilst they will act with all necessary flexibility when drawing or being shifted in certain directions, yet when lifted by the elevated lever they will rise in a rigid condition, as if solid. Such draw links may be fitted to both ends, or to one end only, of a carriage or waggon, corresponding draw hooks being attached to the opposite ends. A transverse elevating shaft is carried in bearings beneath each set of links, this shaft having upon it a lever frame piece with stud projections thereon for lifting the links. Each end of the shaft carries a lever conveniently disposed for the hand of an attendant, outside the buffers, so that, when passing along the train, he can quickly lift or lower the links. When the carriages are to be coupled they are placed together in the usual manner, and the main centre draw link being slackened off, the attendant, by means of one of the projecting hand levers of the adjusting shaft, lifts the whole of the links over upon the hooks of the next carriage, thereby coupling the carriages. Then to tighten the central draw hook link a transverse hand wheel shaft is fitted upon the carriage frame, the centre of this shaft having upon it a worm wheel gearing with a small worm wheel, which is at the same time a nut working on a screwed portion of the draw link. Thus, by turning one or other of the hand wheels the necessary tightness of the draw hook is easily secured. In uncoupling the carriages the links are slackened off and are then lifted clear off the hooks, and afterwards dropped to a vertical position by the converse of the operation previously described.

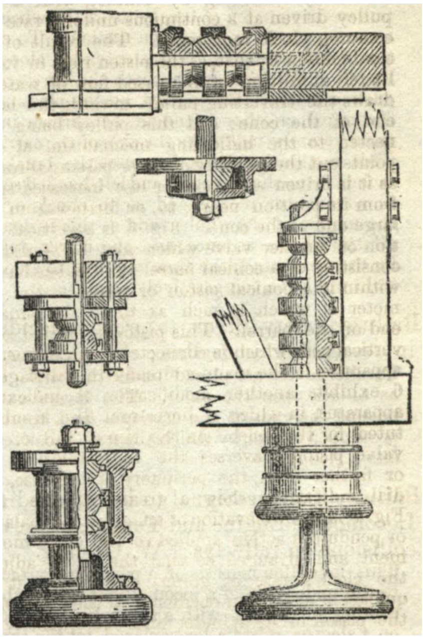
*47. Patent Railway Safety Wheels; E. Wharton.

In these wheels the felloes and tyres are dovetailed together, so that if the tyre should break it cannot fly off. No bolts or rivets are required.

48. Patent Regulator Valve for Locomotive Engines, to shut off steam to prevent accidents on railways; S. Harrison.

This invention is chiefly applicable where two engines are coupled together. It consists in the use of slide valves placed between the pipes that supply the steam to the engine and the steam chests. These valves are worked by a handle acting on the valve spindle, the object of them being to enable the steam to be shut off from one of the engines when anything is out of order, and to allow the steam to enter that which is not out of order. In case of need the driver could instantly close one of the slide valves, and continue to work the locomotive with one engine—causing less delay, and thereby less chance of accidents.

49 Conical India Rubber Springs for Railway and other Carriages; G. Spencer and Co.



The advantages of this new form of India rubber springs over the usual steel springs are:—1st. Perfect immunity from the danger consequent on breakage. 2nd. Extreme lightness, the weight being only one-third of the steel springs. 3rd. Great saving in first cost. 4th. Durability. The essential difference between this form of using India rubber as springs, and all those forms hitherto used or proposed, consists in the conical form in which the material is used, and in the use of confining rings to limit the action of the spring, and increase its power by the lateral confinement.

50. Delostear Axle Box, for Railway Carriages, Trucks, &c.; Dixon, Bell, and Co.

50*a*. Patent Springs for Railway Carriages; — Coleman.

51. Safety Stop or Skid, to prevent Collisions on Railways; J. Johnson.

A ratchet wheel is placed within the ordinary wheel, fast on the axle, into which a pall is thrown by means of levers or bands, when the train is to be stopped.

52. Railway Break; — Noone. Exhibited by C. Chatfield.

This break or stop is intended to act upon the rails, and not upon the wheels. Each series of stops or breaks is raised or depressed by a series of levers, in connection with a horizontal bar, to which motion is given by the break screw.

*53. Invention for Retarding and Stopping Railway Trains; J. Ellerthorpe.

The main feature of this invention is the simultaneous application of breaks to all the wheels of a carriage or train by its own motion. To effect this, a rod or shaft of iron is extended along the length of the train and beneath the carriages in such a manner that it may, at the pleasure of the guard, or other attendant, be thrown into a rapid rotatory motion by the axle of the carriage. This motion immediately causes the breaks attached to the shaft by right and left-handed screws to advance or recede, and so to check or stop the motion of the whole; and as this is done to all the wheels at once, and the power applied by the train itself, the time required to stop any train would be comparatively small.

54. Railway Safety Break, to prevent accidents in descending an incline; W. Gosling.

Parallel levers are placed under the carriages so as to act upon the axles. The levers extend beyond the ends of the carriages and therefore press upon others, by which the train is converted into a sledge.

55. Railway Danger Signal to be attached to a Locomotive Engine and Tender, to prevent collisions on railways; W. Gosling.

This invention consists of a pendulum attached to the under-side of a locomotive tender, which, coming in contact with a stop when turned up on a sleeper, raises a lever placed by the side of the tender, from which connecting rods raise the break, turn off the steam, and ring a bell to apprise the driver of danger.

56. Railway Communicator, to enable Passengers and Guard to communicate with the Driver. Also to enable the Guard to ascertain immediately the carriage from which the communication is made; W. Gosling.

57. Apparatus for Preventing Collisions on Railways; C. J. Brunker.

58. Railway Guards' Alarum Sound Signal; H. King.

From the roof of the guard's carriage a pair of powerful bellows is to be suspended, always kept distended for use by means of springs. To the nozzle of the bellows a small tube is attached, which tube passes upwards through the roof of the carriage, upon which a whistle is placed.

59. Railway Passengers' Train Signal; W. Glazier.

This model is intended to represent an arrangement of gutta percha tubing and valves, for the purpose of affording to railway passengers the means of communicating with the guard, as well as the guard with the driver. By means of a lever fixed inside the carriage, passengers have the power of instantaneously signalling the guard, and of then transmitting the message. In affixing this signal to carriages, no alteration in their construction is necessary. A simple pressure on the lever admits a current of air into the tube (caused by the velocity of the train); this current is employed for signalling the guard, the valve being reversible, so that no difficulty will be experienced in attaching fresh carriages to a train, and continuing the current of air to the guard's van when required.

60. Railway Guard and Driver's Signal, for intercommunication between the guards and drivers on trains; A. Bird.

61. Patent Improved Detonating Railway Signal; A. A. Routledge.

62. Patent Economic Signal Lamp; Saxby and Co.

By this invention one lamp only is required to give all the necessary signals to both the "up" and "down" lines, instead of two as now used; while the working of it is simple. The lamp is so constructed that gas may be introduced without altering the fittings, and it can be fixed to the old signal posts. Upon a bracket are two handles, placed to the right and left of the centre; the right-hand handle gives the signal to that portion of the line on the right of the signalman, the left-hand handle gives the signal to that portion of the line upon the left of the operator. These handles are attached to two vertical rods, one within the other. On the top of one of these rods the lantern is fixed, carrying with it the different coloured glass. To the top of the other a simple horizontal disc is fixed, which carries the coloured glasses. The lantern only makes half a revolution. Each side of the bracket carrying the handles is painted in three colours—white, red, and green—and the operator has only to place either or both of the handles over the centre of either of the colours to cause that coloured light to be shown by either or both of the lenses of the lamp above. In the centre of each colour is a stud, or pin, to retain the handle in its place, so that a signal, when given, cannot be accidentally altered. These lamps are in use on the London, Brighton, and South Coast Railway.

63. Hand Signal Lamp; G. H. Ingall.

*64. Station and Train Signal; G. H. Ingall.

*65. Patent Communication between Passengers and Guards; G. H. Ingall.

*66. Patent Railway Train Indicator, for Preventing Collisions on Railways by showing the position of the Train between each Station; G. H. Ingall.

*67. Self-acting Post, for Curves and Approaches to Stations; G. H. Ingall.

*68. Patent for Enabling the Engine Driver to pass a Train from one Line of Rails to another without the Assistance of a Pointsman; G. H. Ingall.

69. Patent Railway Sanding Apparatus and Drivers' Time Keeper; J. Beall.

This apparatus consists of a means whereby dry sifted sand, grit, or other suitable material may be dropped on to lines of railway immediately in front of the driving wheels of a locomotive engine, in suitable quanities, as the slippery state of the rails, or the rate of inclination of the line may require; and where the line of railway is such as not to require such additional bite to the driving wheels of the locomotive, the dropping of the dry sifted sand, grit, &c., is stopped by the closing of a valve, under the control of the driver.

70. Patent Rails for Railways, to be rolled in two or more parts, top and bottom, so as to renew the top without the bottom, when worn; E. Bagot, C.E.

One of the models represents a broad flange sleeper rail, to be laid direct upon ballasting, and thus save sleepers and chairs; and also save the renewal of the broad flat base, when only the top requires it. The advantages claimed are:—Permanent base, wrought iron sleeper; moveable top, easily changed when worn; economy in first cost of construction of road; increased saving, each renewal of top; less labour in repairs, and no disturbance of ballasting; top and bottom breaking joint, thus acting as "fishing;" better joints, without the expense of "fishes;" more steady uniform road; more comfort, and fewer accidents; and different iron in top from bottom.

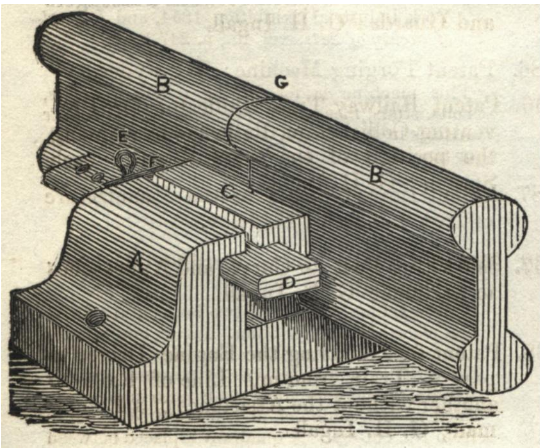
71. Continuous Rail, for Railways; A. S. Jee.

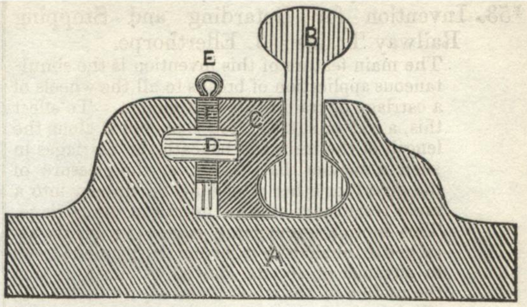
This rail is made in two halves, longitudinally, which being fastened together by bolts and nuts, or by rivets, in such manner that they will break joint with one another, form a continuous rail.

72. Patent Railway Chairs; I. Ashworth.

In this invention the ordinary wooden key is replaced by a plate or bar of iron, somewhat smaller than the space between the chair and the rail. Set screws are screwed through the side of the chair, and pressing against the bar of iron secure the rail in its position. Lock-nuts are introduced between the head of the screw and the face of the chair, preventing any shifting of the rail.

73. Patent Railway Chair; J. Coates.





The wooden key is here replaced by one of iron, but smaller than the space between the rail and the chair. The key is kept in position by means of a cotter driven between it and the chair, and parallel to the rail.

74. Self-keying Railway Chair; T. Greenshields.

The rail is firmly secured in the chair by means of a wedge-shaped bracketed piece of iron, that tightens as it is driven in until the rail is securely fixed in position; a bolt or trenail is passed through the bracketed piece and the bottom of the chair and driven into the sleeper, and, thus fixed, it is not liable to shift or become loose. The joint where the end of two rails meet is secured by a chair at the end of each rail; this mode admits of readily adjusting any inequality in the two rails.

75. The Rocket Railway; F. J. Wilson.

76. The Trough Tramway: F. J. Wilson.

77. The Letter Bag Railway; F. J. Wilson.

78. Patent Railway Traverser; T. S. Watson, B.A.

A portion of the rails, chairs, sleepers and ballasting across the permanent way, is removed to form a space sufficiently wide and deep for the traverser to work in. The spaces in the rails are supplied by moveable rails, each of which is supported by two chairs placed under its extremities. Every chair is carried on two wheels, by which it traverses along a rail supported transversely to the line on iron arches, or girders, springing from the sides of the space in which the traverser works. Motion is communicated to each line of chairs by an endless chain passing alongside of, and attached to, each chair. The two endless chains are carried round two pairs of wheels, fixed on axles under the platforms beyond the outer line of rail. Each axle is connected by a system of cogwheels, or other convienent method, with a winch, working in an upright pillar on the platform, which one man is able to turn. The advantages proposed are, that the traverser is always ready to transfer a carriage in either direction, not requiring after shifting one carriage to be brought back again for the next—it moves, at one time, as many carriages as there are lines of rail less one—it is worked with much less labour than any other traverser or turn-table, and as the whole of it always either forms a part of the line of rails, or is out of the way beneath it, does not incumber the line when not in use. It saves the time and labour expended in turning the carriage on the turntable and in pushing it across the line, and it removes the necessity for the clumsy and dangerous openings at the edge of the platform for the turntable to revolve in.

MANUFACTURING MACHINES AND TOOLS.

80. Patent Tape Loom; Lord Berriedale.

This loom is intended for manufacturing narrow goods of all kinds, such as tapes, ribbons, and other goods, where each loom contains an extended series of shuttles or weft-conductors working in a continuous line, and all, or most of them, in action at once, upon its separate line of fabric. In weaving such fabrics in the ordinary manner, the whole set of shuttles must always be stopped whenever the weft thread of any single one breaks, or whenever it is necessary, from any cause, that one or more shuttles should be stopped or removed. In this loom, the shuttles are so arranged, that any one of them may be stopped and taken out without disturbing the rest or stopping the loom. This is accomplished by adapting a species of detached duplex race for each individual shuttle, one above the other, the upper one only being actually used for the traverse of that particular shuttle therein, whilst the lower one is contrived for the periodical entry therein of the next shuttle on each side of the particular one which is stopped. So long as the whole of the shuttles are in regular work with unbroken threads, the series works just as in the ordinary way; that is, the whole line traverses a certain distance across the line of goods—the first shuttle filling up the place left by the second, and the second that of the third, and so on throughout the series. But when any given shuttle is to be stopped and removed, the particular race or guide of that shuttle is made to ascend by a spring detent action, so that the intended shuttle shall be carried up out of the line; whilst the same movement obviously carries up the lower or duplicate race into the line of shuttles, to afford a place for the reception of the contiguous shuttle on each side of the one removed, as they alternately come across from each side. The whole of the other shuttles still continue to weave, whilst the elevated or disarranged shuttle may be removed by the attendant, and reinserted in its race when again ready for work; when so inserted, the duplex race is made to descend, and the removed shuttle is thus brought back to its line of action. It is obvious that the weaver must watch an opportunity, both at the removal and return of the shuttle, so that the loom's action may not not be interfered with in any way.—(See *Practical Mechanics' Journal* for June, 1853.)

82. Improved shuttle Peg; C. Catlow and T. Comstive.

This improvement is intended to prevent the knocking off of "cops." It consists of a tapered spring, the stronger end being brazed on at the small end of the peg, so that the front end of the spring is always the stronger.

*83. Treading Motion; C. Catlow.

The treading trappets, when moved, cause the treddles to be lifted by the springs, which alternately raise the yarns.

85. Model of Renton's Ore Welding Furnace, for the manufacture of Wrought Iron direct from the Ore, with samples; E. Rider.

This invention consists of a new and improved method for making wrought iron direct from the ore, by mineral coal or wood. The furnace consists of a brick chamber, in which is enclosed a series of fire-brick tubes, connected and joined to a puddling or welding furnace. The mode of operation is as follows:—The ore is first pulverised, and, after having been mixed with a certain per centage of pulverised coal (usually about 20 per cent.), for carbon, it is raised, by means of elevators, to the top of a chamber, and poured into tubes. The tubes being filled, are usually left open at the top, so that the carbonic acid gas, which is generated by the oxygen of the ore yielding itself up to the carbon mixed therewith, may escape. The heat from the puddling or welding furnace passes around the tubes in which the ore is enclosed, heating them to a high red heat, until the ore has given up all its oxygen, and is thereby fully brought into the metallic state. After the ore has been heated from twelve to eighteen hours, and has thus become sufficiently deoxydized, it is dropped into the ore box, and from thence it falls, by means of an inclined plane, directly into the welding furnace, where it is worked or welded into loops or balls, and taken thence to the hammer. The ore is thus kept free from the atmospheric air and all direct influences of the flame and gases.

(See Professor Wilson's Special Report on New York Industrial Exhibition, 1854, and *Journal of Society of Arts*, vol. iii., p. 247.)

86. Patent Forging Machine; W. Ryder.

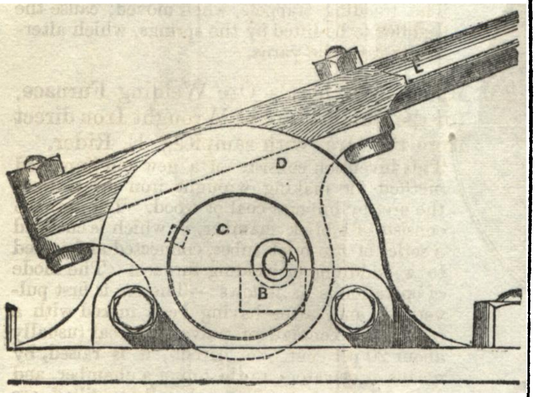
This machine is for forging rollers, spindles, bolts, studs, files, shaft ends, and various other articles in iron or steel—round, square, parallel, or taper. (See the *Artisan*, for 1851.)

87. Patent Improvements in the Manufacture of Iron Tubes; J. Madeley.

88. Patent Circular Plate Cutting Machine; J. Sibley and Son.

This machine consists of two horizontal rollers, one placed above the other, having cog wheels at one end, and circular shear-edged cutters at the other. Motion is given by means of a winch handle. The plate to be cut is held in a clamp, fixed upon a slide rest at the required distance from the cutters. A quadrant is placed between the clamp and the rest, for regulating the diameter of the plate to be cut. A helical spring acts upon the upper cutting roller, to adapt the machine to plates of varying thickness. This machine is for the use of tin plate workers, braziers, meter makers, and others requiring the lighter kinds of circular plates, cut from the centre point or from a hole in the centre, where they are required for machine purposes, or even without a centre at all. Specimens are exhibited of plates cut by a larger machine on the same principle in ten seconds.

89. Patent Machine for Cutting Bolts, Rods, Spindles, Wire, &c.; A. P. How.



This machine consists of a cast-iron base plate and bearing, D, to which is attached the die-rest by two studs. The die B may be removed and replaced by a larger or smaller one, as required. In the bearing D is the disc C, containing the circular die A, which, as in the case of the die B, may be removed and substituted at pleasure. The bar or rod to be cut is introduced through this aperture of the die A, to the distance required; the lever E, being depressed, the bar is cut by the pressure and cutting action of the dies A and B. The facility for using several sizes of dies in the same machine is an especial convenience.

90. Patent Rotary and Ratchet Drill combined; — Chesterman. Exhibited by Cutts, Chesterman, and Bedingfield.

This instrument can be used either as the ordinary ratchet drill, or, by applying the handle, the rotatory motion may be obtained, thus securing expedition in drilling, and the power of using it where the ordinary ratchet cannot be applied.

91. Improved Drill and Bit Stock: C. F. Stansbury. Exhibited by Nourse and Co.

The improvement consists in so constructing the drill stock, that by means of a reciprocating motion of the handle a continuous rotary motion in one direction is given to the drill or bit. This has long been a desideratum, as the drill stocks in common use reverse the motion of the drill at every stroke, thus losing half the time, and unnecessarily wearing the tool. This drill stock wears the tool much less, and loses no time. In making this drill stock, a metallic rod is employed, similar in transverse section to those usually used for such a purpose, but instead of giving it a similar twist throughout, it is twisted one half of its length to the right, and the other half to the left. On the rod thus prepared, a sliding handle is loosely placed, having ratchet teeth in each of its ends corresponding with the teeth of two slides placed respectively on each end of the rod. These slides fit so closely to the rod as to cause it to revolve when a reciprocating motion is imparted to them. They are loosely held in place by means of caps on the ends of the handle. The handle is of such a length as to prevent the slides from ever passing the middle of the rod. The operation of the improved drill and bit stock is as follows:—When the handle is raised, its upper ratchet teeth engage those of the upper slide, which, being thus fixed, imparts rotary motion to the rod; when the motion of the handle is reversed, the upper slide is released, the lower ratchet teeth of the handle engage those of the lower slide, which in its turn becomes fixed, and imparts rotation to the rod. The rod having a different twist on its lower half from that of the upper, it is obvious that the lower slide, in descending, must give the motion in the same direction to the rod that the upper slide imparts to it in ascending.

*92. New Mode of Grinding and Drilling Steel and other Metals; by the use of which the workmen are not liable to those painful and dangerous diseases of the chest to which they are subject by the old process; — Chesterman. Exhibited by Cutts, Chesterman, and Bedingfield.

For the purpose of grinding both sides of a flat article, or the entire periphery of a circular or similarly-shaped article, the inventor fixes upon a central tube or axis, a grindstone in the form of a roller or cylinder, and makes this stone plain or indented with semicircular or other grooves, according to the shape of the article to be ground, and over this grindstone roller he mounts another similar to it. Upon rotatory motion being imparted to the rollers, and the end of the article to be ground being inserted between them, they will draw it through, but without grinding it; the article is then to be drawn or pushed by the workman in a contrary direction to the rotation of the rollers, and the grinding will then take place in its passage between them. The sides of one of the rollers, when the articles to be ground are flat, are also provided with collars formed of grindstone, and of a larger diameter than that of the rollers, whereby the edges, as well as the sides of the metal article, may be ground, where requisite, at the same operation. Means are provided for adjusting these rollers to suit the thickness of the articles to be ground, and also for adjusting the stones on the central tube or axis. For the purpose of grinding one side only of a steel or metal article at a time, a plain wooden roller is substituted for one of the grindstone rollers; and combined with this arrangement are guide-rollers for cross grinding. These improvements in grinding will be found of especial advantage in the case of saw-grinders, who, as a body, are subject to severe diseases of the chest and lungs, called "the Grinder's Complaint," caused by their sitting or standing over the stone. To such an extent is this com-

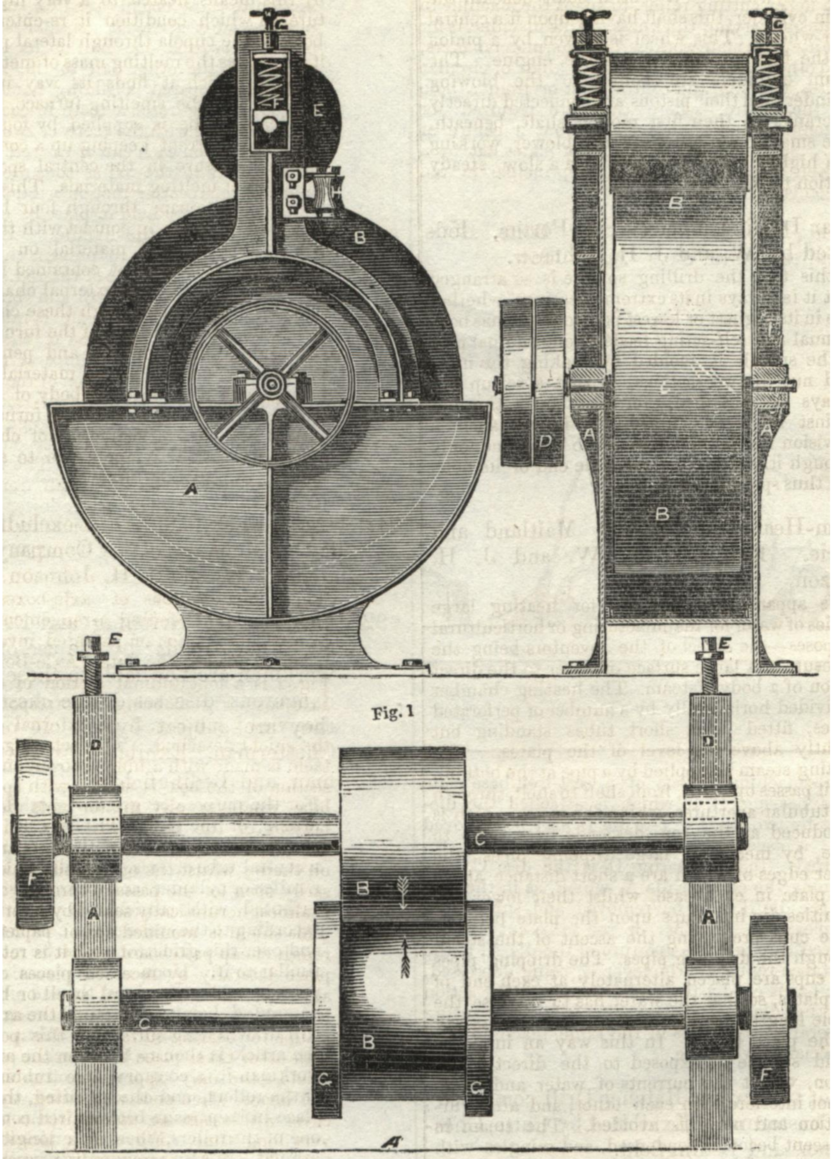


Fig. 1

plaint prevalent, that it is no uncommon thing for persons thus employed to become incapacitated from following their occupation at a comparatively early age. By the present improvements this evil will be in a great measure obviated, as the men will be enabled to grind articles at a considerable distance from the stone, and in front of it instead of leaning over it, as is the common practice. Another important consideration is, that in the event of a grindstone flying to pieces —by no means an uncommon occurrence—the men will be much less likely to be injured, or perhaps killed, while standing at a distance from the stone, than if they were over it, as they would be under the ordinary system.—(See *Mechanics' Magazine*, vol. I. page 458.)

*93. Patent Cross Boring and shaping Machine; J. Haley.

*94*a*. Blowing Engine; Neilson and Co. Exhibited by W. and J. H. Johnson.

Instead of using one large steam cylinder at one end of a vibrating beam, with an air-forcing cylinder at the other, as usually arranged, Mr. Walter Neilson, the designer of this blowing engine, adopts a pair of small inverted vertical cylinders, which drive the great blowing piston through a wheel and pinion. The great blowing cylinder is set vertically, on a low frame, and its piston has two rods working out above, with an overhead crosshead guided by slotted standards

Side rods pass from this crosshead to pins in a pair of flywheels on a central shaft beneath the main cylinder, this shaft having upon it a central spur-wheel. This wheel is driven by a pinion on the first motion shaft of the engine. The steam cylinders are bolted to the blowing cylinder, and their pistons are connected directly to cranks on their first motion shaft, beneath. The small steam pistons of this blower, working at a high velocity, communicate a slow, steady motion to the blowing piston.

*94*b*. Pillar Drilling Machine; J. Porter. Exhibited by W. and J. H. Johnson.

In this tool the drilling spindle is so arranged that it is always in its extreme bearings, whether it is in its highest or lowest position. It has both manual and self-acting feeds. Longitudinal play in the spindle is avoided by making the main feed nut in two sections, so that a set-up can always be obtained, for tightening the nut against its screw threads. Without such a provision the drill point is apt to break suddenly through its work when near the end of its hole, and thus spoil the work.

*94*c*. Steam-Heater for Water; Maitland and Gorrie. Exhibited by W. and J. H. Johnson.

This apparatus is intended for heating large bodies of water for manufacturing or horticultural purposes—the object of the inventors being the exposure of a large surface of water to the direct action of a body of steam. The heating chamber is divided horizontally by a number of perforated plates, fitted with short tubes standing but slightly above the level of the plates. The heating steam is supplied by a pipe at the bottom, and it passes upwards, from shelf to shelf, through the tubular apertures, whilst the water, which is introduced at the top, descends from plate to plate, by means of large dripping pipes, the upper edges of which are a short distance above the plate in each case, whilst their lower extremities dip into cups upon the plate below—these cups preventing the ascent of the steam through the dripping pipes. The dripping pipes and cups are placed alternately at each end of the plates, so that the water has to traverse the whole length of a plate before it can find its way to the plate below. In this way an immense liquid surface is exposed to the direct steam action, whilst the currents of water and steam do not interfere with each other, and all regurgitation and noise is avoided. The steam in its ascent becomes condensed, and mingles with the water, which passes off in a heated state, by a syphon or weighted valve at the bottom. This heater is in active operation at the Carsebridge Distillery, Alloa, as well as in many noblemen and gentlemen's conservatories.

*94*d*. Blast-Furnace for Iron Smelting; Wright and Brown. Exhibited by W. and J. H. Johnson.

In the cupola the cold air enters from the blowing apparatus by a pipe, and passes through the cupola wall into the central portion of the bottom of the cupola. The air diverges downwards in this chamber, and passes out through vertical division-walls by archways into expanded chambers at the sides. The arrows indicate the course of the air, showing how it circulates to the extreme end of these chambers, and returns along their arched tops. The air is by this means heated to a very high temperature, in which condition it re-enters the main body of the cupola through lateral ports. Here it permeates the melting mass of metal and coke, through which it finds its way in the usual manner. In the smelting-furnace, the air from the blast-engine is supplied by four pipes, the quadruple current keeping up a constantly uniform air-pressure in the central space beneath the mass of melting materials. This compressed air can only escape through four lateral archways, and it passes in contact with the surface of the melted mass of material on the furnace bottom, as well as that contained in the archway passages and their external chambers. The heated air rises up through these chambers and returns towards the body of the furnace through converging thoroughfares, and penetrates the melting mass of metal and materials by issuing through side ports into the body of the furnace. This system of self air-heating furnaces may be carried out with various forms of chambers and apparatus, and it is applicable to all forms of melting or reducing furnaces.

*94*e*. Grease-tight and Dust-excluding Axle-Box; Patent Axle-Box Company. Exhibited by W. and J. H. Johnson.

Three modifications of axle-boxes are here shown, comprehending arrangements deduced from a combination of patented inventions, and recommended by the Patent Axle-Box Company. Fig. 1 is a longitudinal section of one form of axle-box; Fig. 2 being a corresponding inner face view; and Fig. 3 an external elevation of the shield detached. The actual grease receptacle is made with a hinged cover, and the lower section of the box is stuffed with sponge to imbibe whatever oily matter gets down to the bottom of the box The box being entirely closed at its external end prevents any escape of oil there; whilst the other end, which is necessarily open for the passage through of the axle, is almost hermetically sealed by a vertical shield. This shield is moulded out of papier maché, or rough cheap pasteboard, and it is retained in its place laterally by recessed pieces cast on the axle-box end. A central swell or boss portion is moulded upon it to surround the axle and give a superior bearing surface at this point. Very little wear takes place between the axle and the shield—the only appreciable rubbing parts—and hence, when once well fitted, this retaining cover will last in an unimpaired condition for a very long time. Fig. 4 is a longitudinal section; Fig. 5 is a corresponding inner end view; and Fig. 6 is a transverse section of a somewhat modified form of this class of box. In this box the grease passes downwards through a series of vertical passages in the brass, these openings being fitted with sponge or other porous material. A piece of sponge is also held in a recess cast on the inside of the cover-plate of the box, and is made to descend into a channel through which the grease flows on its way to the brass. By this means the downward supply of grease is regulated or moderated, whilst the porous material thus interposed filters the grease to a pure condition before it can reach the parts to be lubricated. The guard shield for preventing the escape of oil at the inner end of the box is retained in vertical grooves, as in the former example, and is made either of pulpy material or of wood, the action being precisely the same as that described in reference to the earlier figures. Fig. 7 is an external end view, and Fig. 8 a transverse section of another form, differing but slightly from the last. The brass is dovetailed into the box, and it is made double, so that, when worn on one side, it may be reversed, and thus begin anew. The oil escape on the axle side of the box is prevented by an external metal washer, or shield, formed with two parallel vertical slots, for shipping on a pair of dovetailed stud projections on the box end.

*94*f*. Wood-planing Machine; J. Mc Dowall and Sons. Exhibited by W. and J. H. Johnson.

In this machinery the cutting details for operating upon both the upper and under sides of the wood, and also the two lateral edges, are disposed near the centre, and the deal to be planed is passed through the machine by means of a series of nipping feed cams. There are six sets of these feed cams—three at each end of the machine—and they are carried by separate frames, to which a backward and forward motion is given by a system of revolving cams and levers acting beneath the framing of the machine. The feed cams are constructed so as to nip the deal only when moving in one direction, namely the direction in which the deal is passing through the machine, and they pass back freely over the deal when returning for a fresh feeding movement. The movements of the cams do not coincide with each other, but are arranged so that one cam at each end shall always be carrying the deal forward, the movement being taken up by another cam before being dropped by the one in action, so that a continuous and regular feed motion is obtained. As the board is thus carried forward, it comes first above three finishing planes, over which it is held down by three rollers. After passing these pressers, the emerging end of the wood, as planed and finished on its under surface, proceeds beneath a pair of pressing rollers, between which the planing of its upper surface takes place. A little before the deal reaches the cutters for operating upon its upper surface, its two lateral edges are acted upon by cutters revolving upon vertical spindles, and arranged in the present example for tongueing and grooving the opposite edges of the deal, as is done for the purpose of laying flooring. Having undergone the action of the edge cutter and top surface planers, or "thicknessers," the deal is drawn completely through the machine in a finished state.

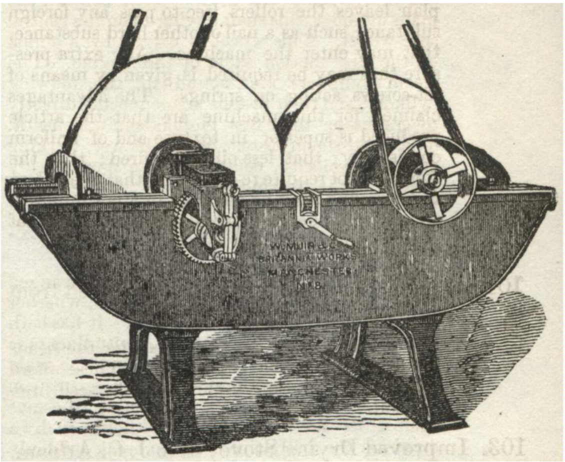
95. Patent Lubricators; J. Bonnall.

Hollow India-rubber balls are employed as receivers for the lubricant. By gentle pressure the lubricant is expelled.

97. Upright Shoemakers' Bench; J. Sparkes Hall.

It is generally known that the bent sitting posture in which shoemakers work is highly injurious to health. The posture is maintained in some cases for as much as twelve or fourteen hours in a confined atmosphere; the spine, stomach, and bowels become disordered, and at a comparatively early age, numbers of this class solicit admission to the Hospital for Consumption.

98. Patent Grindstones; W. Muir and Co.



These grindstones require no adjustment. The peripheries touch each other, and by a lateral motion given to one of them, the edge of each stone is kept perfectly true.

99. The Iron Clicker; a machine for cutting out boots and shoes. J. Sparkes Hall.

By the use of this machine, one person may cut, with greater correctness, more boots than six persons could accomplish in the same time by the ordinary process; and the saving in material amounts to 25 per cent. A piece of leather generally used for one pair of ladies' boots of a particular pattern, will be sufficient for three pairs if cut according to the new plan.

99*a*. Double-action Eyelet Hole, Stay, or Boot Punch, worked by a treadle; T. E. Moore.

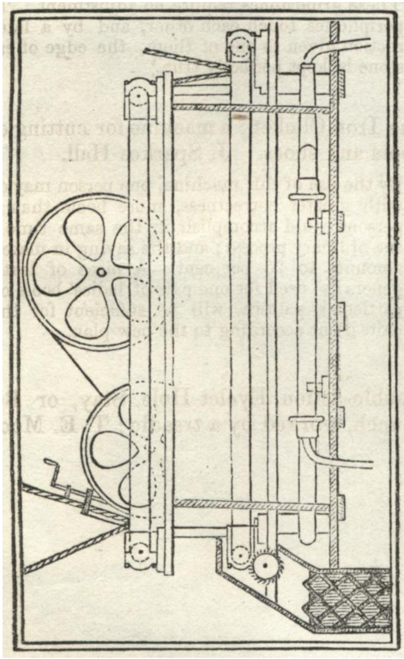
100. Patent Crushing and Grinding Machine; W. F. Plummer.

This machine is intended for grinding white lead, white oxide of zinc, and for all other purposes for which horizontal stones are used. It consists of a set of three rollers, composed of granite, so arranged as to be self-adjusting when at work, rising by the substance passing between them, and falling by their own gravity. This plan leaves the rollers free to pass any foreign substance, such as a nail or other hard substance, that may enter the machine. Any extra pressure that may be required is given by means of set-screws acting on springs. The advantages claimed for this machine are that the article produced is superior in texture and of uniform consistency; that less oil is required; that the stones do not require re-dressing; that the colour to be ground may be changed in a few minutes; and that it is kept quite cool compared with that ground with horizontal stones.

101. Machine for Separating the Flax Seed from the Straw; W. Dray and Co.

The mode of operation is by passing the heads of the straw between two rollers. These afford just sufficient pressure to throw out the seed from the boll.

103. Improved Drying Stove; J. & J. C. Adnam.



Adnam's Drying Stove.

This stove is used in the manufacture of Adnam's improved groats and barley. The stove is heated by steam, and filled with moveable aprons, over which the grain is allowed to traverse, and delivered into the hopper at the end of the stove. The speed of the apron is arranged according to the temperature of the stove, and the quantity of grain required to be dried.

104. Apparatus for Roasting Coffee and Cocoa, for the Use of Soldiers in Camp, Sailors on Shipboard, Emigrants, and Families; A. Savage.

No. 1. This apparatus may be used over a fire lighted on the ground, the hooked spike which supports the roaster when in use being driven into the earth until it rests on its flanch. The spindle is supported by the hook on which it turns, the cylinder being over the fire. It is kept steady by the additional handle, held in the left hand, and the winch turned by the right hand. The additional handle is also very useful to enable the user to lift the roaster away from the fire, as by sliding it along the spindle it enables him to do so without risk of burning the left hand. When used over a galley-fire on board ship, or over a common kitchen range or stove, a suitable support, which fits on the stove, is substituted for the hooked spike, driven into the earth, which supports the roaster over a camp-fire on the ground. For naval use it is preferable to have a cover to put over the roaster, to retain the heat; and for domestic use a smaller cylinder would be more suitable. This apparatus is capable of roasting about sixteen pounds of coffee at once; but roasters on this plan may be made to roast from a quarter of a pound to thirty pounds weight, to suit the various requirements of private families, emigrants, hotel-keepers, or the wants of a ship's crew. This apparatus is made to receive the mill No. 2, for grinding coffee or cocoa, inside it, with the necessary tools. It will also hold about twenty pounds of unroasted coffee, although not larger than a side drum. The piece of wood to which the mill No. 2 is clamped may be supposed to represent the portions of two tent poles, of different diameters—the clamps being capable of embracing any pole whose diameter does not exceed four inches, or is not less than two inches. Ordinary coach screws would be preferable for fixing the mill to a flat side post or stancheon, or to a dresser, counter, table, stool, or chair. No. 3. Another form of mill, especially designed for use on board ship. No. 4. Mill for grinding coffee, drugs, &c. No. 5. Mill for grinding coffee, cocoa, pepper, spices, &c., for domestic and naval use.

105. Masticating Machine; A. Lyon.

This machine, as well as cutting or masticating the food, is intended to keep it hot while the operation is effected. This is accomplished by means of two hot-water bottles, which form the inside of the machine.

106. Improved Mincing or Cutting Machine; A. Lyon.

This machine is lined with white metal, to avoid rust or absorption.

107. Improved method of purifying Coal-gas by clay and lime; Rev. W. R. Bowditch.

Specimen No 1. Clay before use. Specimen No. 2. Clay as taken from the purifier after use. Specimen No. 3. Clay after exposure to the atmosphere. This contains a large quantity of nitrogen, phosphorus, and sulphur, and is a valuable new manure. This process consists in exposing gas alternately to moistened clay and lime, by which means the sulphurized and nitrogenized products of distillation are more completely removed than by any mode of purification in use. Gas is thus rendered more wholesome, and its illuminating power is improved. The usual test for sulphur in gas is acetate of lead, and when it shows no reaction with that substance, it is thought to be sufficiently purified. The use of clay, however, shows the fallacy of this test. When the foul clay is digested in spirits of wine, a compound of sulphur is dissolved in abundance, which gives no reaction with acetate of lead ; but yet, if this spirit be burnt in a clean spirit lamp, the products of combustion are found to be highly charged with sulphuric acid. Clay removes the ready-formed ammonia, which exerts a very corrosive action upon brass fittings, and diminishes the illuminating power of the gas. It also abstracts several other compounds of nitrogen, to which is due the dark greenish belt in an ordinary flat gas flame. The new manure thus obtained has been tried with great success upon white turnips and broccoli, and is now being used for various descriptions of corn, &c.

108. Domestic Purifier, for the Use of Clay upon the Consumer's Premises; Rev. W. R. Bowditch.

This purifier is fixed adjacent to the meter. It is filled with clay which has been broken small and moistened, and the gas passed through it. This clay will be found to remove sulphuretted hydrogen—which may be driven off by a mineral acid, and detected by lead paper and ammonia, which caustic lime will repel, and the sense of smell, or turmeric paper, will detect. Other compounds removed by it may be detected by the proper chemical tests.

109. Super-Phosphate Compost and Gas Purifier; J. W. Perkins.

BUILDING CONTRIVANCES AND MATERIALS, AND HARDWARE.

110. Patent Indurated Stone; the Indurated Stone Company.

These specimens consist of a comparatively worthless sandstone, which, on being worked with a small amount of labour, and subsequently impregnated with a preparation of tar or resinous material, becomes as hard as granite, and absolutely impervious, indestructible, and non-vegetative. The merits of the invention consist in the advantageous adaptation of any cheap and otherwise unusable stones, as well as loam, chalk, and even sand, to building and monumental purposes of every kind; and, as a consequence of the small cost of the original material, at prices far below those of stones, paving tiles, &c., in ordinary use. The specimens consist of a piece of the stone in its natural state, Stevens' hollow bricks and culvert bricks, pavings and kerbs, pitching bricks, a grindstone, a sink, a black polished chimney piece, a green polished jam, a brown polished slab (these latter showing the natural vein of the stone), a carved head and foot stone, several indurated plaster of Paris casts, also an example of Stevens' roofing, with indurated slabs and joints.

112. Patent for the Preservation of the Surfaces of Stone, &c.; J. B. Daines.

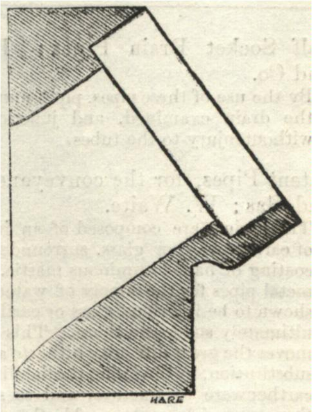
The mode of treatment under this patent is, by first dressing the stone or other surface to be operated upon in cases where decay has commenced, or the material is fragile, with a compound solution of certain stone-producing constituents, for the purpose of adding density thereto, as also for the purpose of neutralizing alkaline efflorescence, and to form a basis to receive the solution of sulphur obtained in linseed oil, which is to be applied with a painter's brush, until the surface operated upon will absorb no more.

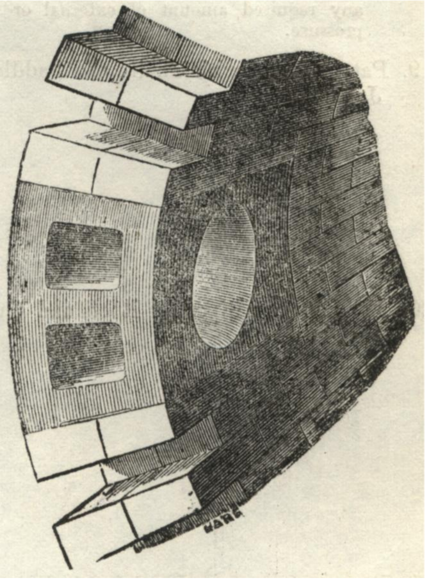
113. Waterproof Artificial Stone for Pavements, inverts for Sewers, Steps, &c.; T. Furse.

114. Specimens of Lizard Serpentine, cut by improved machinery, for chimney pieces, and architectural and ornamental purposes generally; the Lizard Serpentine Company.

115. Patent Junction Blocks; H. Doulton and Co.

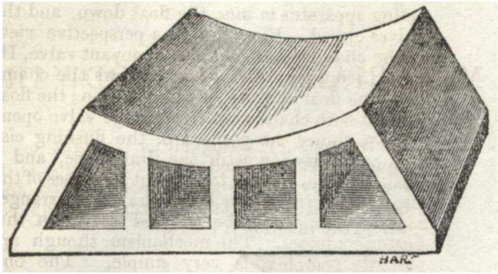
Each block is made to correspond in thickness with the sides of the brick sewer, so as to build or bond in with the brickwork; the inner surface is made to correspond with the internal figure of the sewer. Each block has a socket, either within its thickness or just protruding beyond it, to receive the end of a pipe. They are made to receive pipes, entering either straight or obliquely. When fixed they form part of the sewer; they cannot be improperly placed, and a certain and proper fall is secured at the point where the junction is made.





116. Invert Blocks for Sewers; H. Doulton and Co.

These blocks are made in glazed stoneware, and have an even and imperishable surface for the bottoms of brick sewers, and also a sure foundation for the structure. They have been used extensively by the Metropolitan and City Commissioners of Sewers, and for the main sewers in many provincial towns. They offer the means for carrying off all superfluous water while the sewer is in course of construction, and when required give a channel for land drainage independent of the sewage, as they may be perforated at the sides.



117. Half Socket Drain Pipes; H. Doulton and Co.

By the use of these pipes, pipes may be removed, the drain examined, and junctions inserted, without injury to the tubes.

118. Patent Pipes, for the conveyance of Water and Gas; W. Waite.

These pipes are composed of an internal lining of earthenware or glass, surrounded by a strong coating of hard bituminous mastic. The use of metal pipes for the supply of water having been shown to be injurious, glass or earthenware must ultimately supersede them. This invention removes the great difficulty hitherto attending that substitution, by obviating the liability of glass and earthenware to fracture, and so strengthening those materials as to enable them to withstand any required amount of external or internal pressure.

119. Patent Drain with Chairs and Saddles ; G. Jennings.

120. Earthenware Pipes for Roofs and Gutters; —

121. Patent Hoop Iron Bond for Building purposes; F. Tyerman.

The object of this patent is to give to the ordinary hoop iron at present so extensively used as bonds in buildings, an additional key, whereby its tying or holding qualities may be increased. This is effected by nicking the hoop iron at distances of about a foot apart, on both sides alternately, and turning up or down a triangular piece so as to form a claw.

122. Improved Trapped Street Gully; the Phœnix Foundry Company, Lancaster.

The sludge box resting upon the bottom of the gully, forms a double syphon trap. This construction presents the following advantages. 1st. Perfect facility for flushing. 2nd. Great head to overcome stoppage. 3rd. The part constituting the trap has small surface of evaporation; and 4th. It is entirely out of the reach of the sun's rays.

123. A Self-acting House-drain Flusher, made the full size requisite for an ordinary Dwelling-house; Dr. Gray, Dublin.

This apparatus is intended to scour out the house drain daily by the sudden discharge through it of a quantity of pure water sufficient to sweep away all matter, liquid or otherwise, that may have accumulated in the drain, leaving the drain perfectly washed as well as cleansed after each operation, and thus maintaining it always in the condition most suitable for its perfect action as a conduit for the removal of refuse matter. It has been ascertained by a series of experiments, carefully conducted by the inventor, that the discharge from a water-closet of the ordinary class is not sufficient to "sweep" the soil out of the drain pipe into the street sewer, even where no "accidental" obstruction exists:—that the soil in some cases takes days, and even weeks, in its gradual passage into the street sewer, during the entire of which time it not only constantly gives off foul gases that fill the drain and are ready to force an entrance into the house at every chink, but materially tends to facilitate the formation of accumulations that may ultimately choke the drain and necessitate its being opened, after having caused much suffering and annoyance, and possibly disease and death. These experiments suggested the idea of a self-acting cleansing apparatus ,that would daily scour out the drain, and sweep all matters passed into it away from the dwelling before decomposition could set in; thus freeing the house from all offensive and noxious effluvia, and giving security against all ordinary causes of stoppage of the drain. The apparatus exhibited effects these ends, and is so designed that it economises the water, accumulating a small constant supply received from the general main, and, when accumulated, discharging it into the drain through a large valve as a flush—thus effecting the scour at a cost of about 25 gallons daily for a medium-sized house, which at 6d. per 1000 gallons amounts to about 4s. 6d. as the yearly cost of keeping the house-drain always sweet, free from deposit and from foul air, in perfect action, and secure against stoppage. Twenty-five gallons is the quantity deemed requisite for a moderate-sized house; fifteen would suffice for a small house; fifty would be abundant for a large hotel with a single pipe drain. It may be observed that the apparatus is entirely self-acting, and once put into operation requires no superintendence whatever, but will perform its stated functions without interruption once a day, or at any other periods arranged; and may continue so to act for years without requiring any repair if the water supply be preserved. The accompanying woodcuts show the mechanical arrangements of the apparatus. The letters correspond in the several figures. The apparatus consists essentially of a cistern, Q, in which the water accumulates; of a supply apparatus, P, fig. 1, by altering the position of which the supply may be regulated or stopped;

of a large valve, H, for the discharge of the accumulated water; of a float, A, for raising the valve, H, from its seat; of a float chamber, B, in which the float, A, sits; of a valvular communication, F, fig. 3, which suddenly allows some of the water accumulated in the cistern to rush into the float chamber, B, and to cause the float, A, to open the discharge valve, B, and, of a syphon pipe, N, which carries off the water that entered the chamber, B, and thus, by letting down the float, A, and the valve, H, to its seat, reduces the apparatus to the inaction represented in fig. 1, and allows the water again to accumulate in the cistern for another flush. Fig. 1 represents the cistern with the self-acting apparatus *in situ*, the float down, and the valves closed. Fig. 2 gives a perspective view of the chambers, the float and buoyant valve, H. fig. 1, being removed. Fig. 3 shows the chambers, the float and the valves in section; the float up, and both chamber and discharge valve open. Fig. 4 shows the position of the flushing cistern in connexion wtih the drain pipe, and a junction water trap, V, to shut out the gases of the street sewer from the house drain, an arrangement which cannot be adopted save with the flushing adjunct. The mechanism, though apparently complex, is very simple. The one shown is made of zinc, and by an ordinary tinman. The valve, H, I face with leather or india-rubber, and the seat, S, Fig. 3, I make of wood, earthenware, or bottle glass, as more economic than metal.

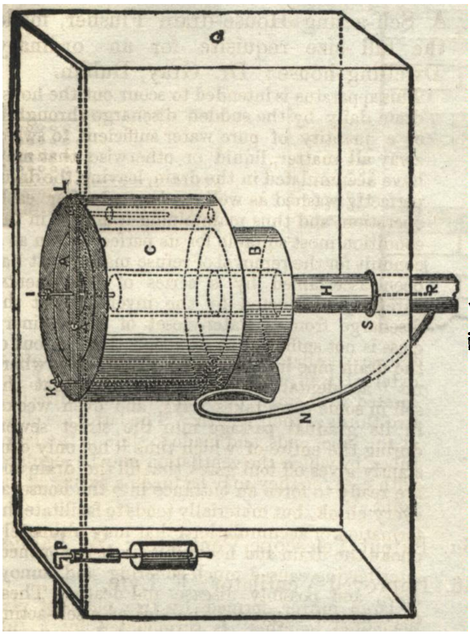


Fig 1.

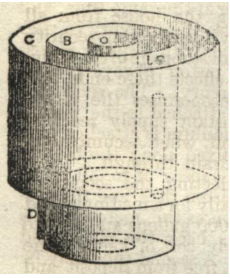


Fig. 2.

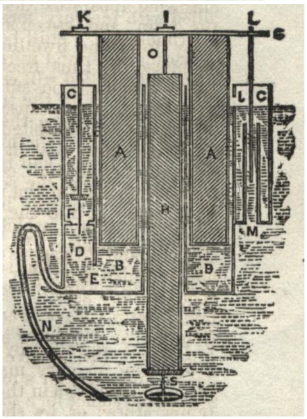


Fig. 3.

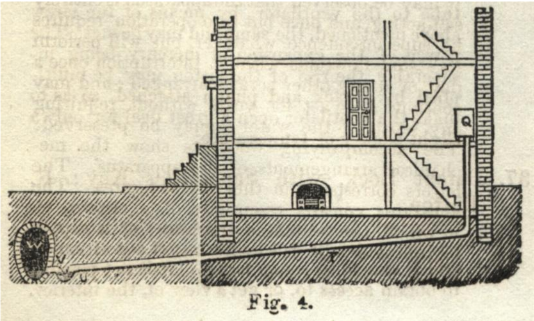


Fig. 4.

124. Patent Noiseless Cast Iron Chimney Cap; J. Kite.

This cap is composed of an inner and an outer case, closed at the top, the inner one having openings in the centres of each side with bevilled flanges, the outer one opening at the angles, so that no direct draught can descend the chimney, while the smoke is aided in its issue.

125. Patent Chimney-top, for Producing an Upward Current; T. Hawkins, LL.D.

126. Patent Cowl; T. Hawkins, LL.D.

127. Patent Verrotic Chimney Cleaning Machine; E. W. K. Turner.

This machine is designed for thoroughly cleansing or scraping, thereby preventing the accumulation of hard soot in the slopes or angles, which is the principal cause of chimnies taking fire. It is composed of thin strips of steel, properly tempered, and bent into a series of triangular or fan-shaped pieces. A number of these are arranged so as to form a circle, in the centre of which is a vulcanised India rubber block, to which the scrapers are attached, thus forming a figure resembling a wheel. This machine, when in operation, always presents a scraper acting at right angles with the chimney; the scrapers are rendered perfectly elastic by being twisted slightly so as to present their flat sides as they approach the centre. Several other improvements are made to suit particular purposes, such as a balance wheel for ascending a right angle by elevating the point of contact above the line of propulsion. Also a joint for allowing the head or brushes to drop when descending the slopes, instead of being pressed hard against the top as at present. Also an arrangement for causing the brush, &c., to ascend in a semi-collapsed form.

128. Three Models, showing the application of Zinc to various kinds of Roofs; the Vieille Montagne Zinc Mining Company.

129. Patent Sanitary Parquet Paving for Kitchen floors, halls, passages, footpaths, &c.; W. Norris.

This paving is manufactured in blocks of any required form or dimensions, each block being composed of small pieces of wood set upon asphaltic concrete. The wood used may be any suitable scraps or that which is imported in short lengths, duty free, and usually sold for firewood. By arranging different kinds of wood or staining the pieces of different shades, a variety of patterns may be introduced. The blocks are cemented together by asphalt, and when so cemented constitute a flooring perfectly impervious to damp or vapour, and impenetrable by any kind of vermin. The wood used being of the cheapest description and no joists being required, this flooring can be laid down as cheaply as the commonest deal flooring or even stone flags.

129*a*. Form of Block for Wood Paving; T. Furse.

130. Patent Rope Moulding for circular and sweep frames; G. Sterry.

This moulding can be made to any pattern or size, and is adapted for all purposes. It has the advantage of being more stable than wood, quite as durable, and much less expensive for all ornamental purposes.

131. Patent Crystal Window; Lloyd and Summerfield.

In this window flint-glass bars support plate-glass, the bars being made in parts, firmly connected by metal rods or tubes passing through them, and having grooves the entire length of the bars for the reception of the plates. These bars are made of various sizes and patterns. Smaller bars are made without tubes or rods, for ordinary sash-windows, sky-lights, exhibition-cases, &c., &c.

132. Patent Reversible Balance Safety Sashes; W. Nash.

These sashes are intended to prevent accidents while cleaning, repairing, and painting windows. Weights and lines are superseded by the use of racks fixed on each side of the sash. These racks work in small pinions attached to the centre of the frame. The axes of the pinions form a centre on which the whole window may be reversed.

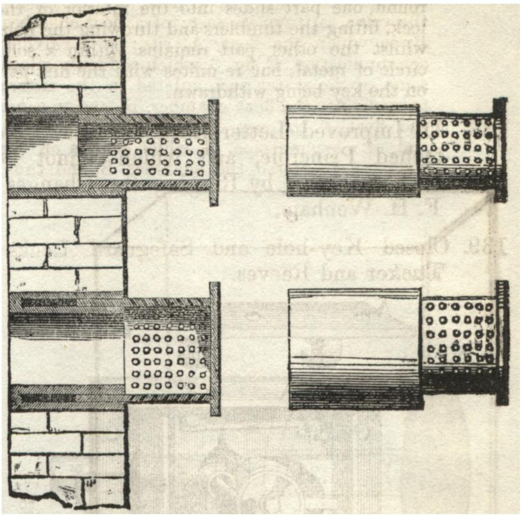
133. Patent Cleats or Stops, attached to a Venetian Blind and an ordinary Window Blind; S. M. Saxby. Exhibited by T. Pemberton and Sons.

This cleat is said to be noiseless in action, and it stops the blind the moment the cord is released. The action of raising the blind lifts an eccentric cleat from its position and affords a free passage to the cords. When in action the eccentric cleat maintains an upright position, but when the cords are released, it falls and holds them firmly.

*134. Design for a 40-cwt. Bell and Gear; W. L. Baker.

A simple additional gear for moving round the bell upon its vertical axis is proposed, in order to present at intervals of time the whole of the circumference of the sound-bow to the wear occasioned by the blows of the clapper. The advantages obtained are simplicity, great truth in the gudgeons, ease in ringing, great durability of the bell and gear, and by the use of iron the rendering of a peal of bells fire-proof.

135. Patent Ventilators; B. Looker, jun.



These ventilators consist of tubes fixed into an external wall, in which others are placed, perforated with small holes in an oblique direction, two-thirds of their length. The latter are closed at the inner ends, and made to slide in the larger tubes, by which the ventilation may be regulated with ease, or they may be made a fixture at any point.

135*a*. Patent Telescope Ventilator; W. Palmer.

*136. Improved Ventilator; F. Lyte.

A large mirror, formed by two plates of glass cemented together, is surmounted by a tube filled with mercury, forming a large and sensitive thermometer. This, being fixed in a wall, forms a thermometer and mirror at the same time, and any heat applied will cause the mercury to rise. A piston runs in the tube, with a spring placed above it, to keep the piston always pressed on the surface of the mercury. The ventilator slides in a frame, and is attached to the piston-rod by a screw as the pendulum is attached to a clock; a piece of lead is fixed along the bottom of the ventilator, which causes it to fall by its own weight, when the piston rises and thus relaxes the cord, but as soon as the mercury falls the spiral spring presses back the piston and draws up the ventilator. A second tube may be let into the side of the mirror, of the same size as the first, and then by a piston in it being withdrawn the mercury may be made to begin to push up the piston in the other tube at any given temperature; or, by shortening or lengthening the string which attaches the piston in the first tube to the ventilator, by means of the screw above mentioned, the same end may be met. The power of the expansion of mercury being insuperable, the rise of the piston may be multiplied by a rack and pinion attached, so as to make the ventilator open a great deal for only a slight change of temperature.

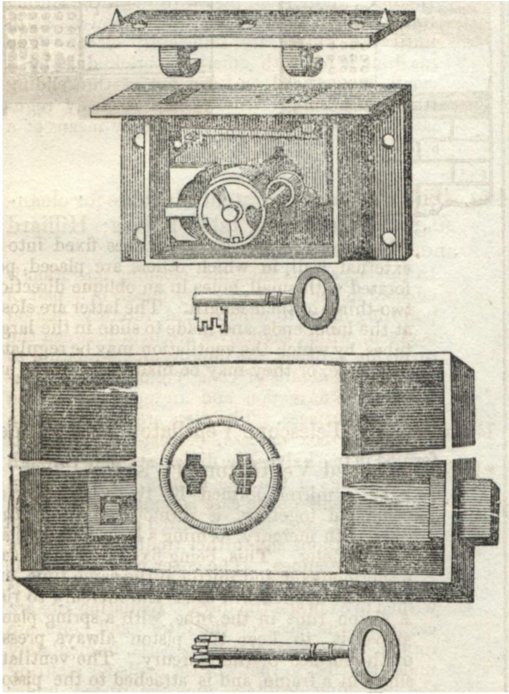
137. Patent Lock, with Separating Key; R. Button.

This lock is solid in all its interior works, is powder proof, is not liable to get out of order, and is simple in construction. It is not possible to obtain access to, or get a view of, the interior.

The key is made in two parts—and on being introduced into the lock, and while turning it round, one part slides into the interior of the lock, lifting the tumblers and throwing the bolt, whilst the other part remains within a solid circle of metal, but re-unites with the first part on the key being withdrawn.

138. An Improved Letter-Lock, on a new Detached Principle, and which cannot be Picked except by Ringing the Changes; F. H. Wenham.

139. Closed Key-hole and Safeguard Locks; Tucker and Reeves.



These locks cannot be unlocked while the key or any other instrument remains in the true key hole. They are constructed so as to prevent picking by pressure or by other means, all communication with the security parts being entirely cut off by the action of an internal revolving key hole, which becomes absolutely closed up, so that no picking instruments whatever can remain in it before pressure can be produced. They are also so made that their security cannot be destroyed, either by tampering with the key, or with the lock through the key hole. They are cheap, durable, and not likely to get out of order, or be deranged by dirt or glutinous oil.

140. Patent Improved Locks; J. Simon Holland.

The distinguishing features of the "Albion" lock are the curtain and the additional set of tumblers. The curtain effectually prevents the introduction of gunpowder, and also T-headed bolts, which are used by burglars to tear a lock to pieces. It also confines the angular action of picks within very narrow limits, and renders it necessary to have as many picks as curtain plates. By having the curtain plates of various lengths, changes may be rung on them, as well as on the tumblers, thus squaring the number of changes given by any other tumbler lock having the same number of tumblers. The second set of tumblers come into play only after the first set have been locked in their action; they then oppose the withdrawal of the bolt, and while doing so cannot be in any way interfered with, so as to ascertain which amongst them are so opposing. Thus, after a set of "notches" have been entered by the main stump it is impossible to tell, by feeling the bellies of the tumblers, whether their notches are true or false ones. The "latch" lock is gunpowder-proof. Turn the handle against the sun, then insert the key. Turn the handle with the sun, and you open the lock. In the "Mortice" lock—the two ribs give increased fastening in a thin door.

141. Patent Arrangement to Detect any Tampering with the Key of a Lock. J. Simon Holland.

The strong room of a bank may be locked, and the key given to the porter to take to the banker's residence, and should he, on taking it to the residence in the evening, or to the bank in the morning, make any attempt to copy it, this will be evident immediately on giving it up; or should any one tamper with it during the day, it will be evident, and thus give an opportunity to alter the arrangement of the tumblers and baffle any surreptitious attempt. This is effected by means of a small counter contained in a case attached to the key. After using the key it is drawn into the case, and moves one tooth, which becomes visible through a small hole in the case. The first wheel of the counter contains 31 teeth, the second 24, the third and fourth each 26 teeth. If the key be pushed out before placing the case in a recess outside the keyhole it will not reach the works of the lock when placed in the keyhole, and the key must be drawn into the case before it can be removed. Thus, if a person is entrusted to unlock a lock once only, he ought to bring back the key with its counter advanced only one tooth; if, besides unlocking, he pushes the key out of its case to examine it, the counter will be advanced two teeth.

142. Patent Door Lock Furniture, in china, glass, wood, and metal; B. Pitt.

In this furniture the necks of the knobs extend to the sides of the lock, thereby obtaining a longer bearing on the spindle and in the door. The screws being tapped through the spindles, they become firmly fixed; and even should the doors be thin, the screws cannot come off, as in pulling the door the pressure is against the lock.

143. Self Adjusting Bush and Spindle, for Door Knobs and Handles, &c.; F. Clark.

By turning the "milled" shoulder near the rose plate of the door, the distance between the two knobs or handles of the door is increased or diminished, so as to render one and the same spindle (within given limits), suitable for doors of different thicknesses; by turning the knob or handle when the milled shoulder is screwed on the spindle close to the door, the spindle is turned just as it is by an ordinary knob or handle, and acts on the latch of the lock or latch. No screws, &c., are required to secure the knob to the spindle.

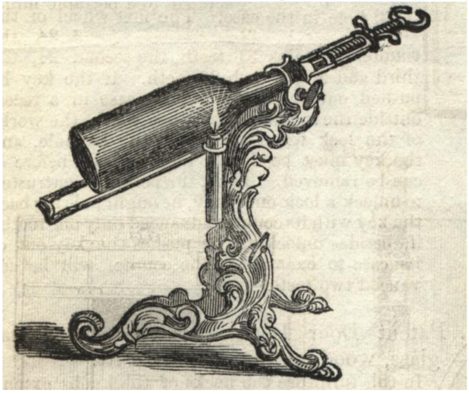
144. Improved Castor; F. Clark.

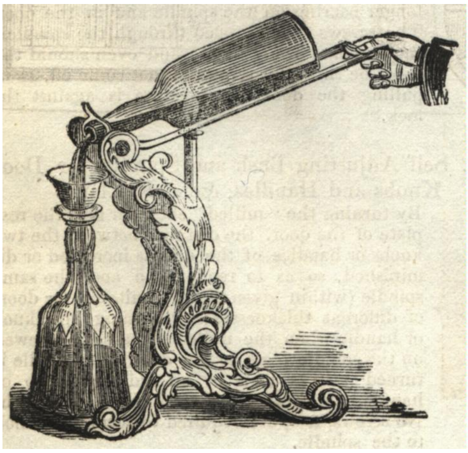
The same principle is applied to this object as that adopted for the spindle and bush for door knobs, &c. The arms for the bearings of the roller are cast in one piece with a spindle or pivot, and the same is provided with a shoulder-piece, cup-shaped and turned over a **V** groove outside at bottom of the "sheath," the end of spindle or pivot being first introduced into an orifice at the bottom of the sheath, whereby the roller is secured to the sheath, and revolves round it as in ordinary castors, but with less liability of destruction to the pivot, &c.

145. Brushing and Cleansing Machine; C. B. Clough.

These improvements relate as well to certain mechanical arrangements of rotatory brushes for various cleansing purposes, as to the application of gutta percha, leather, india-rubber, or other elastic material, to form the foundations of brushes, as well as for the rollers employed in the apparatus. The apparatus exhibited is applicable to the ordinary domestic purposes of brushing and cleaning; but principally for use at doorways and other places, for brushing and cleaning boots, shoes, &c. A framework supports two revolving shafts, the upper one being the driving-shaft, furnished with a winch-handle. Upon the other end of the upper shaft a pulley is keyed, which gives motion to the lower shaft, on which two brushes are keyed. (See *Practical Mechanics' Journal*, April, 1853.)

146. Patent Uncorking and Decanting Machine; — Lane. Exhibited by T. G. Shaw.





By this mechanism the cork may be drawn from the bottle without danger or difficulty, and the contents poured out, in whole or in part, without the slightest disturbance of the crust or sediment, and the bottle will remain at any elevation till again raised or lowered.

147. Copper Warming Pan; W. Young.

148. Patent Self-feeding Knife and Fork Cleaning Machine; R. Terrett.

This machine is composed of two pieces of framing, one of which contains the apparatus for cleaning the knives, and slides within the other. The knives are inserted at apertures in the outer frame, and passed through the sliding frame, which is drawn backwards and forwards until the knives are sufficiently clean. The machine is fed with emery or brick dust by a small box placed on the top of the sliding frame, the supply from which is easily regulated. The pressure is adjusted by means of a screw.

148*a*. The Furbator; a Patent Machine for cleansing and sharpening table-knives; Hilliard and Chapman.

In this apparatus the knife-cleaning operation is effected in the usual way, by means of a pair of polishing discs, to which rapid rotatory motion is given, whilst the knives are held between the revolving surfaces, the improvements relating to the general details of construction, and particularly to the formation and arrangement of the polishing surfaces. The discs are mounted in a cylindrical box or case, of cast-iron, which is formed in two halves, the division passing through the bearings of the disc spindle. Thus, when the upper half of the case is removed, the discs are exposed, and may be lifted out upon their spindle, without any further trouble with screws or other fastenings. The cover may be hinged to it at one side, so as to turn over when it is wished to examine the discs. Radiating ribs are cast upon the faces of the discs; and holes are formed in the discs at various parts, immediately under the ribs, so that wires or cords for securing the polishing leathers, may be passed under them. The discs are pressed together by powerful springs, which act upon the outsides of the discs, and abut against small discs upon the spindle. The discs and casing of the knife-cleaners are made of cast-iron, thereby avoiding the tendency to warp and get out of shape attending those of wood as hitherto constructed. It has also been customary to adjust the pressure of the discs by means of screws—a system involving uncertainty, and requiring frequent alterations to suit different sizes of knives—or, perhaps, the operator will omit to alter the screws, in which case a thin-bladed knife will scarcely be touched, whilst a thicker one will be injuriously ground down. These defects have been overcome by employing springs to press the two discs together. In addition to the foregoing, means have been devised of sharpening the knives in connection with the knife-cleaner.—[See *Practical Mechanics' Journal*, December, 1854.]

149. Rule-Jointed Fire-Brick Register Stove, by which the fire can be made larger or smaller at pleasure; T. Waller.

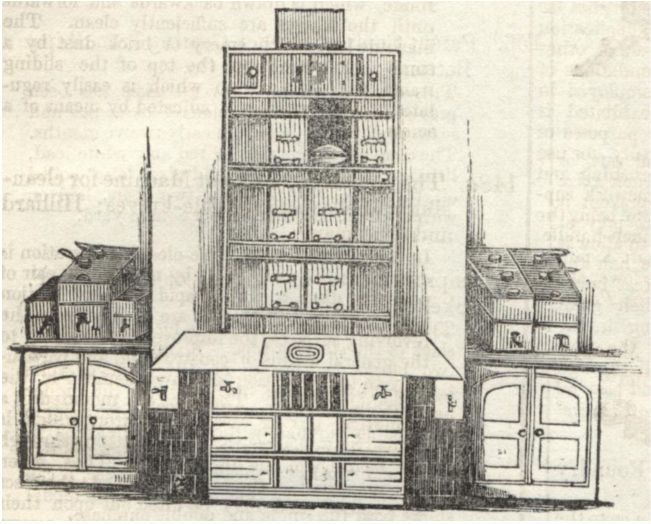
150. Patent Smokeless and Sustaining Fire-Grate; W. Jeakes.

The fire-place is here made sufficiently large to contain the required charge of fuel. The fire is lit at the top, and burns downward. As the fuel is consumed, the bars are lowered.

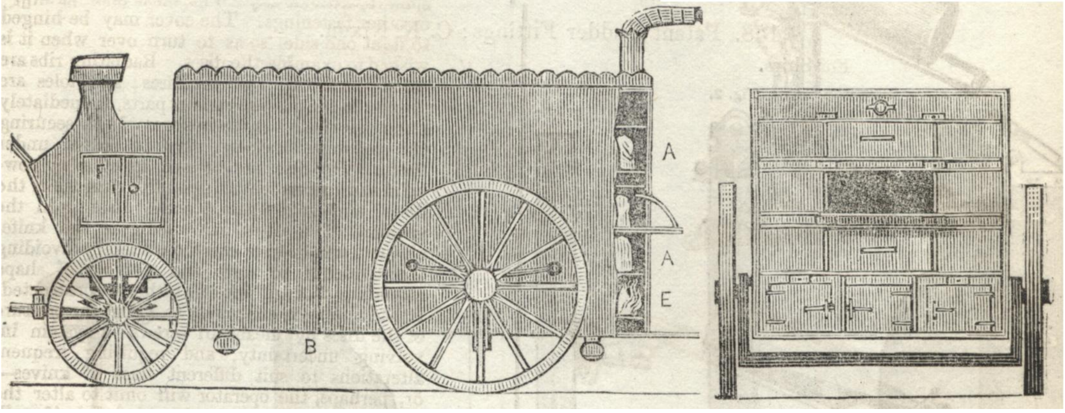
152. Hospital Candle Stove for Heating Water, for the new Smyrna Hospital; Price's Patent Candle Company.

This apparatus is adapted for heating water where an ordinary fire-place or charcoal-stove cannot be used. The candles are placed each in a brass tube, in which is a spring pressing upwards, keeping the candles at a uniform height. Six candles under the boiler give off sufficient heat to enable one gallon of boiling water to be drawn off per hour. The candles will burn for ten hours. The heat is regulated by increasing or decreasing the number of candles. The external case being of wood, and the cover being lined with felt, no heat is lost by radiation. Stove-candles having small wicks, and burning slowly, give off a less quantity of the products of combustion than the same number of candles used for ordinary lighting purposes.

153. Patent Cooking Apparatus; G. J. Norton.

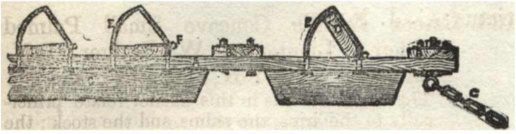


This apparatus combines within itself roasting, boiling, baking and steaming; also warm closets and proving-stoves—all with one fire—at a saving of at least 50 per cent. This is accomplished by introducing into the lower part of the chimney a number of vertical and horizontal passages, through which the hot air from the fire passes, and between which the different baking, warm-closets, and proving stoves are placed. If erected in conjunction with the patentee's roasting range, it is adapted for large establishments. The same principle has been applied to a portable military oven on wheels.



NAVAL AND MILITARY MECHANISM AND PHILOSOPHICAL INSTRUMENTS.

154. Patent Improved Floating Breakwater, for Harbours of Refuge, and for the Protection of Coasts, Harbours, Sea-walls, and other exposed situations; J. Davidson.



This invention consists of a horizontal raft, or rafts, of one plank across another, of such a size as to cover a number of waves, to prevent it from undulating; sufficiently strong to prevent it from yielding to the wave; moored to allow it to rise and fall with the tide; made half the specific gravity of the water—their great buoyancy keeping them from sinking, their great weight from rising. The rafts being in the middle of the wave, that portion of the wave being driven above the rafts, will fall through them, filling up the vacancy below, and pass off at the other edge smooth water. (See *Practical Mechanics' Journal*, Dec. 1, 1854.)

155. Patent Bow Lines; the Phœnix Foundry Company, Lancaster.

These lines are designed to offer resistance to the water *only laterally*, and to avoid entirely the loss of power (more or less common to all other shapes of bow) arising from resistance to vertical pressure. Attention is drawn to the lines bounding the sections, contrasting the new entrance lines, with the after lines, which latter are of the ordinary inclined plane character.

156. Patent Composition for Coating Iron Ships' Bottoms; G. Crane and Co.

This composition, after several trials, has been proved to resist the adhesion of barnacles and seaweed during a period of nearly twelve months. The composition consists of red and white lead, litharge, and japanner's gold size; also boiled oil, turps, &c, The cost for two coats, laid on with a trowel, is about 3s. per square yard.

157. Improvements in Tillers or Yokes; T. Skelton.

The object of this invention is for taking up the slack of the steering rope. It consists in fitting two blocks or sheaves on the tiller or yoke between those on the free end and the rudder head, the same yoke or tiller will do for a single or a double purchase without any alteration in the blocks or sheaves, and by throwing the two additional blocks or sheaves out of gear, it can be used as a common yoke or tiller. The model shows both the single and double purchase.

158. Patent Rudder Fittings; C. N. Nixon.

For Ships.

Fig. 1.

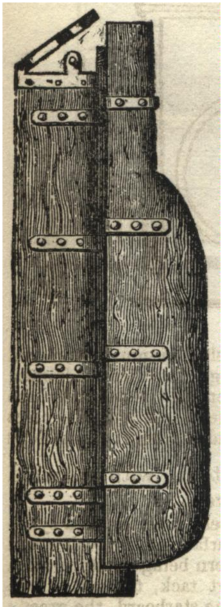


Fig. 2.

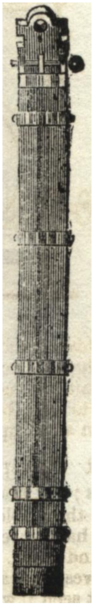
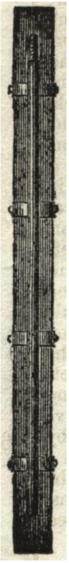


Fig. 3.



For Boats.

Fig. 4.

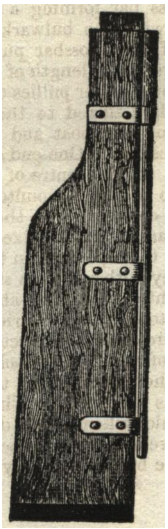


Fig. 5.

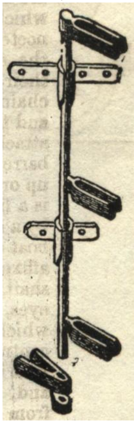


Fig. 1.—Represents the stern-post and rudder, fitted after this method. Fig. 2.—Front view of stern-post, having open gudgeons, B, closed gudgeons, C, and solid socket gudgeon, D—for pivot to work in—Cap A, with hole to admit of the bar passing through and rising a certain height, according to the size of the vessel. Fig. 3.—Front view of rudder, having a long bar—which may be in one length, or several parts—secured with braces, having narrow necks which pass through the open gudgeons, the bottom of the bar, a pivot, which works as above stated. Fig. 4.—Side view of a rudder, adapted for Launches and every description of boat. Fig. 5.—Boat's fittings detached, shewing how the bar passes.

159. Patent Bow-Propellers and Roller-Hause-Holes; Lieut. Morrison, R.N.

The bow-propellers consist of one or more screws, affixed in front of the vessel's cutwater; there being a false cutwater attached to the bow, into which the bearings of the shafts for the screws are made to work. The false cutwater is carried down from the real cutwater, and established into the fore foot, or kelson. On each side of the false cutwater strong curved iron girders are carried to the bows and braced thereto, to support the false cutwater and protect the screws from the friction of the ship's cable. The roller-hause-holes are tubes, which project some feet from the vessel, and are fitted internally with strong iron rollers, on which the cable plays. By these means the cable is carried clear of the screws, when the ship runs ahead of her anchor; and there is an increased leverage gained in heaving in cable and weighing anchor.

160. Apparatus for Lowering and Disengaging a Ship's Boat from the Boat itself; F. Rixon.

The object of this invention is to enable parties in a boat attached to a ship to lower the boat themselves, and having lowered it, to disengage it from the ship both ends simultaneously. This is effected in the following manner:—The davits from which the boat is suspended are made to work upon joints attached to the bulwark of the ship, and their extremities are connected by a cross bar forming a swing frame, always parallel with the bulwark of the ship. In the centre of this crossbar pullies or blocks are mounted to receive a length of rope or chain, which passing over other pullies or blocks connected to a standard affixed to the bulwarks of the ship, sustains the boat and the davits in their elevated position. One end of this rope or chain is secured to the centre of the cross-bar, and the other to a barrel mounted in brackets attached to the crossbar. On the axle of this barrel a winch handle may be fixed for winding up or letting out the rope, and on the same axle is a friction pulley with a friction strap, acted on by a screw to tighten it, and thereby prevent the boat descending too rapidly. Carried by brackets affixed to the crossbar is a circular revolving shaft, the ends of which are hooked to receive eyes, forming the terminals of the chains by which the boat is suspended. This shaft has a central lever, which when pressed down after the boat is lowered, releases the suspending chains, and, thereby, the boat is instantly disconnected from the ship.

161 .Portable Anchor; G. Firmin.

162. Portable Skeleton Anchor; J. Griffiths.

This anchor is so constructed as to stow in less than one-third of its full size. It cants in its proper position, and is equally strong with those in general use. It can be fitted or taken to pieces in a few minutes, and stowed as best suits the trim of the vessel; and the holding-power in light soils can be increased by the addition of storm-fins on the flukes, removeable with ease. It is also convenient to transport to foreign stations or dockyards without the risk of springing the masts or yards, and to supply ships in distress during the winter months.

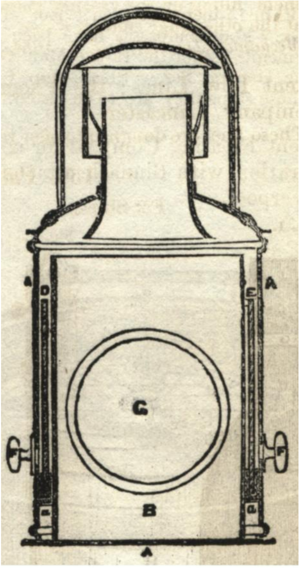
163. Patent Double Concave Small Palmed Anchor; Lieutenant W. Rodger, R.N. Manufactured by Fox, Henderson and Co.

The improvements in this anchor relate principally to the arms, the palms, and the stock; the peculiar forms of which cause it to penetrate deeper into the ground than anchors of the ordinary construction, thereby increasing the holding power with a less weight. It has also the advantage of additional strength.

164. Ship Communicator and Life Line; R. J. Sibbald.

165. Patent Appliances for Ships' Capstans, Windlasses, Chain-lifters, &c.; I. S. Grylls.

166. Patent Nautical Signal Lamp; C. Lewis.



In this lamp an internal shield is provided, placed on the inside of the casing. Two metallic frames, containing red and green glass respectively, are free to slide between the shield and the cases when acted upon by handles from the outside.

167. Patent Bowspirt Lantern, with coloured lenses; G. and J. Oliver.

The three coloured lenses are set round a cylinder having reflecting surfaces above, below and around them. The lantern being a fixture, when the vessel is an the port tack, the red will be most seen; when on the starboard, the green; and before the wind, all three lights.

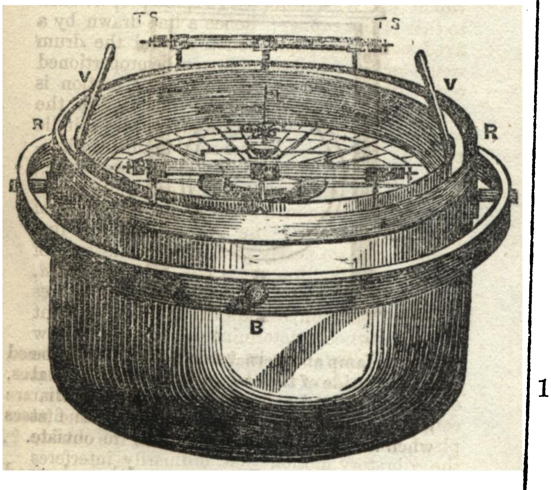
168. Mariners and Emigrants' Safety Pillow; J. Johnson.

169. American Fog Horn; McNaught and Wood.

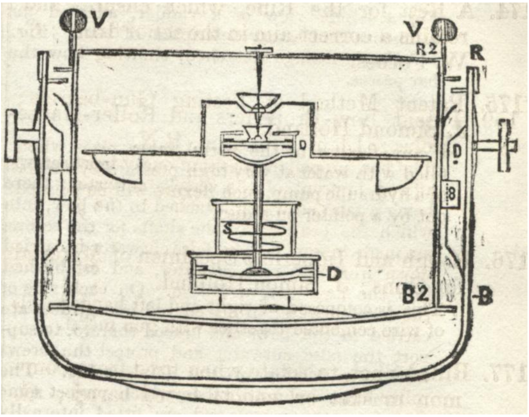
170. Patent Improvement in the Mariners and other Compasses: J. Bigg.

This improvement consists in placing two or more concentric rings of magnets around the compass box, to prevent the disturbing influence of iron, steel, and other matters causing aberration in the needles, from the true magnetic meridian. The inner ring consists of ten, twelve, or any greater number of magnets, separated by placing, between the north and south pole of each magnet,—an armature of soft iron, thus forming a complete ring. These armatures are fixed to the centre of the outer magnets by a screw or rivet. The poles of these magnets do not touch each other, but have a space between them. In making new compasses, these concentric rings of magnets may be very simply secured inside the compass box; but in applying this improvements to compasses already fitted or in use on board ship they will, in most instances, require to be placed outside the compass box, to prevent them (from want of room), interferring with the free action of the compass card. The disturbing influence of either iron or steel on the needles of the compass, is completely prevented by the concentric ring of magnets thus placed, if brought within 15 inches or even 1 foot of the compass box. Four compasses have been fitted on this principle—2 for the Royal Mail Co., and 2 for the General Screw Steam-ship Co., on board whose ships they are to be tested.

171. Patent Floating Compass for counteracting vibration, with Binnacle attached; I. Gray, Liverpool.



B.—Outer Bowl, containing fluid in which
B2—Inner Bowl is floated.
R—Rim of Outer Bowl,
R2—Rim of Inner Bowl.
V.—Vulcanised India-rubber, or other springs to keep the Inner Bowl (B2) in central position within the Outer Bowl B.
T.S.—Tangential Screws to adjust and bring the Inner Bowl (B2) exactly into the centre of the Outer Bowl (B).
D.—Guides to prevent any rotatory motion, which the Inner Bowl might otherwise be subject to, also to keep the Lubber's Point exactly fair, or parallel with the ship's keel.
L.—Lubber's Point.
D —Elastic Discs.
S.—Spiral Spring.
8.—Guide on the Inner Bowl.



The inventor, having discovered that when a compass was held by the hand in a vessel containing fluid, the direct action was cut off from the exterior influences incidental to the magnetic character of iron ships, as well as the disturbances arising from machinery, has applied this principle in the construction of the Floating Compass. He also found that in extreme stress of weather there were some exceptions in the oscillatory motion of the card, arising from the male pieces coming in contact with the female guides, in order to keep what is technically termed the *lubber's point*, in a line with the ship's keel. This he has obviated through the aid of a simple adjustment, kept in a state of suspension in the fluid. INSTRUCTIONS FOR USE.—Open the small shutter in the top of the outer rim, and insert the funnel; pour in water until the rim of the inner bowl floats to the height of the milled edge of the outer one, keeping it always the same, by adding more fluid as it evaporates. By placing your hand upon the glass, and pressing it down, you can discover whether it rides easily. If in cold weather the water freezes, add a little common spirit, or light your lamps. The bands attached to the bottom of the bowl may be connected with the binnacle, to prevent it rolling too far in a heavy sea.

172. Tarpaulin Roller Tent for Military purposes; J. Rock, jun.

This tent is made upon the same principle as the railway tarpaulin roller for goods waggons, in use on the Southern railways. The tarpaulin is the most efficient of temporary coverings, but is liable to damage unless attached to a roller. A tent made as shown by the model will accomodate one man for every two square yards of tarpaulin used. The roller gives great facilities for pitching or striking the tent in all weathers, as well as for ventilation by night or day.

173. A Revolving Rifle, in which the action of Cocking and Discharging is performed by the same Trigger ; F. H. Wenham. Manufactured by Deane, Adams, and Deane.

Draw the trigger as far back as it will go, and it will remain so; this revolves the chamber and places the hammer at full cock. When the trigger is pulled a second time the rifle will be discharged. The same operation is performed for each of the five charges contained in the revolving chamber.

174. A Rest for the Rifle, which ensures and retains a correct aim in the act of firing ; C. W. Forbes.

***175. Patent Method of Testing Gun-barrels ; J. Simond Holland.**

If any flexure of the barrel takes place when filled with water at very high pressure by means of a hydraulic pump, such flexure will be pointed out by a pointer on a disc.

176. Rough and Imperfect Specimen of Material for Guns ; J. Simon Holland.

This is composed of right and left handed coils of wire cemented together with gun metal.

177. Rifled Shot, to rotate when fired from common musket or smooth bored barrel ; G. F. Morrel.

178. Projectiles ; J. Norton.

1. Fog Signal—to be placed on the rails. This model is merely stuffed with paper: the unfilled varnished papers show the stages of formation. It is evident that it cannot *rust* or become *damp*. 2. Whistling Bolt—to be shot by the guard of a train high over the head of the engine-driver, or on one side of him. The cartridge can be attached to the end of the bolt, and is fired without previous opening. 3. Fire-ball Bolt. The quick match is placed between the shaft and the ball: the latter of course can be made to produce any colour of fire or flame. 4. Explosive Percussion Bolt Signal. The igniter is the *last* inserted; and the bolt, falling on grass or soft clay, is sure to explode by the fracture and consequent friction of the glass tube igniter. 5. Elastic Expanding Sabot. Its base is fortified by a circular piece of sole or stout leather, glued on with gutta percha: with this Sabot *iron* shot may be fired from a rifle without injury to the rifle or other gun. 6. Cartridge, that does not require to be *opened* previous to or in the act of loading. It can be drawn *entire*, when required, without spilling any portion of the powder. 7. Implement for Firing Cannon without a vent or touch-hole: it is easily fitted on at the mouth of the gun, and the firing of the gun cannot derange it. 8. Shot or Shell made of pressed clay, cement, or artificial stone for Artillery. It will be efficient against all but stone walls. 9. Frictional Exploding Signal, that may be thrown from the hand, and caused to explode at the end of a cord high in the air: it can be used to warn a train *following* not to run into a train brought to a stand by an accident, as in the melancholy case near Straffan. 10. Glass-tube Igniter. When charged with percussion-powder or lucifer-composition, the ends are closed with cork, glued in with liquid glue. 11. Sabot, made of pressed leather, of such a form as to enclose the lower half of a spherical shot or ball. 12. Improved Cordage, so as to give greater strength to the strands forming the rope, cord or band. 13. Rifle Arrow or Bolt, adapted to Sharp's American breech-loading rifle. This has been shot to the distance of nine hundred yards. The cartridge may be attached to it, so as to enter the barrel without cutting off the end, as is the manner with Mr. Sharp's cartridge which is attached to his shot. This bolt is peculiarly efficient for *vertical* fire, to dislodge an enemy from behind strong buildings, ramparts, or other cover.

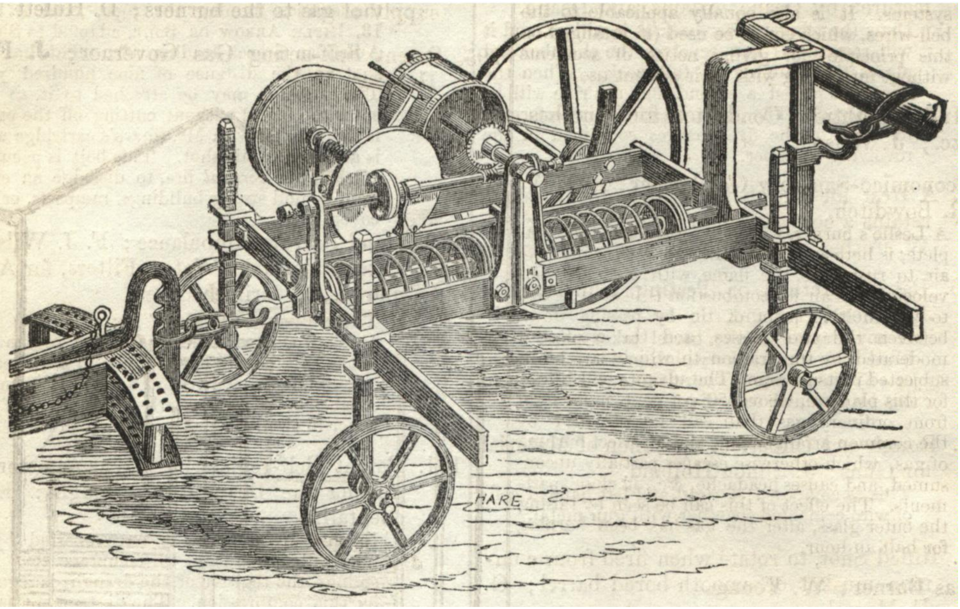
179. Hand Barrow Ambulance ; F. J. Wilson.

180. Patent Portable Water Filters, for Army purposes ; Griffith Owen.

These filters are made of gutta percha. Each hospital conveyance cart attached to the army in the east, carries one of them in a wicker case and sling. These weigh 18 lbs. each, and are capable of yielding nearly fifty gallons of clear water in twenty-four hours when in use.

181. Patent Self-registering Dynamometer for testing the Draught of Ploughs: E. H. Bentall.

In this instrument the force exerted by the horses being made to compress two spiral springs, the register of the draught is regulated by this compression. The instrument is supported by an iron frame and four wheels. A strap from the nave of one of these wheels drives a rigger, and with it a metal disc fixed on the same axle. The flat surface of this disc acts on an edged runner, which is capable of sliding on its axle, and is, during the experiment, moved by means of a fork connected with the spiral springs to various distances from the centre of the disc proportioned to the compression of the springs; it is, therefore, driven faster or slower in direct proportion to the draught of the plough. On the same axle with the edged runner is a worm that acts on a cogged wheel, along with which revolves a drum with a speed proportioned to that of the runner; hence a line drawn by a fixed pencil on paper coiled around the drum would for equal lengths of furrow be proportioned to the draught of the plough. But motion is given to the pencil in a direction parallel to the axis of the drum, by a screw cut on the spindle carrying the disc, and the motion in this direction represents the length of furrow drawn; while the two motions combined cause the pencil to describe a diagonal, showing the variations of the draught during the experiment, the line becoming more nearly parallel with the axis of the drum as the draught is less, and *vice versa*. A brass wheel, with its edge graduated, revolves also with the drum, to show the degree of draught in stones, when a determinate length of furrow is drawn. This may be used or not, as may be found most convenient. There are several obvious advantages belonging to the peculiar construction of this instrument. In the first place, no special means are needed to obviate the vibratory motion that ordinarily interferes with other modes of construction; for the power that moves the drum acts uniformly in one direction, and the only effect produced on the drum by variation of draught is simply increase or diminution of speed. Secondly, the draught, with all its variations is registered by the instrument itself, without requiring the attention of the experimenter. Thirdly, no after calculations of averages are needed. Fourthly, while in ordinary cases averages are calculated from a limited number of observations, the averages registered by this instrument are the same as if calculated from an infinite series, for the additions are made at every instant, from the commencement to the termination of the experiment.



182. Patent Weighing-Machine; — Schonemann. Exhibited by R. & L. R. Bodmer.

The combination of connecting links and stays secures a parallel motion of the moveable parts of the weighing-machine. The beam rests upon a fixed pivot, and can be constructed for any convenient proportion between the weight and load. These weighing-machines occupy only half the space of other platform weighing-machines of the same power, and are more accurate and sensitive.

183. Apparatus for Distinguishing Genuine from Counterfeit Coin; G. Davis.

Over the till a gauge-plate, having a number of slits corresponding with the different coins, is suspended. From the under surface of this plate a bearing is suspended, on which a number of bent levers work. One arm of each lever passes under each slit, being held up against it by the weight of the other arm, and so adjusted as to counter-balance a spurious coin, but not a genuine one. It will thus be seen that this apparatus enables either a larger or a lighter coin to be detected.

184. Gold Coin Detector, applicable also as a Weighing Scale for Letters; Pierre Savouré. Exhibited by E. Rascol.

There are three openings in the lever, one for the double sovereign, the second for one sovereign, and the third for half-sovereigns. The gold coins are subjected to the double test of weight and gauge. The machine exhibited gives the double testing by one operation. A coin, if good, will go through the opening, and will counterbalance the weight; if too light, the lever will remain unmoved; if too thick, the coin will not go through. The machine may also be adapted as an inkstand, as shown in the article exhibited.

185. The Maynooth Single Fluid Battery; Rev. Nicholas Callan.

This battery consists of cast-iron and amalgamated zinc, excited by any of the following fluids:—First, undiluted muriatic acid, or muriatic acid diluted with a small quantity of water. Secondly, muriatic and sulphuric acid together, diluted with a quantity of water twice, or a little more than twice, as great by measure as that of the sulphuric acid. Thirdly, the common sulphuric acid diluted with about twice its bulk of water, or the strongest diluted with 3 times its bulk of water. Fourthly, the common sulphuric acid mixed with 3 times its bulk of a strong solution of common salt, or the strongest sulphuric acid mixed with $3\frac{3}{4}$ times its bulk of the same solution. The last is preferable to any of the others. When the cast-iron and zinc are very near to each other, this battery circulates more electricity in a given time than any other battery yet made. The inactive part of the iron should be protected against the action of the exciting fluid, by covering it with a substance on which the fluid acts but little, or not at all.—(See *Mechanics' Magazine*, vol. lxii., page 249.)

186. Patent Improvements in Telegraphing; R. Walker.

The peculiarity in this mode of telegraphing is, that the batteries are in constant connection with the conductors, but in such a way that a connection requires to be made between those conductors before the batteries are brought into action, a connection *at any part of the line* having this effect on both batteries. By using a double instrument at the intermediate stations, messages may be sent to the right only, to the left only, or both ways simultaneously. There is a portable indicator, which can be carried in the pocket, and may be connected with the wires at any part of the line, when a communication with all the stations may be made and acknowledged. By this arrangement, only one current of electricity can be given. This, however, is all that is necessary for either the French or American systems. It is also equally applicable to the bell-wires, which could be used (if arranged on this principle) for giving notice of accidents without interfering with their present use.

186*a*. Index Lightning Conductors for Churches, &c.; J. Wilson.

187. Economico-Sanatory Gas-burner; Rev. W. R. Bowditch.

A Leslie's burner, with outer glass and cup complete, is here exhibited. Instead of allowing *cold* air to rush into the flame with an enormous velocity, the air for combustion is heated nearly to the melting point of tin by passing down between the two glasses, and the current is moderated by the friction to which the air is subjected in its passage. The advantages claimed for this plan are, above 50 per cent. more light from ordinary gas than can be obtained by the common arrangement, and a perfect burning of gas, which otherwise escapes partially unconsumed, and causes headache, &c., in close apartments. The effect of this can be seen by raising the outer glass, after the gas has been burning for half an hour.

188. Gas Burner; W. Young.

189. Tripod Vesta Lamp; W. Young.

190. Patent Bin-Oxydised Lamp; W. Young.

191. Gas Standard; F. Skidmore and Son.

191*a*. Chalice; F. Skidmore and Son.

192. Patent Enamelled Gas Shades; F. and W. Whitehead.

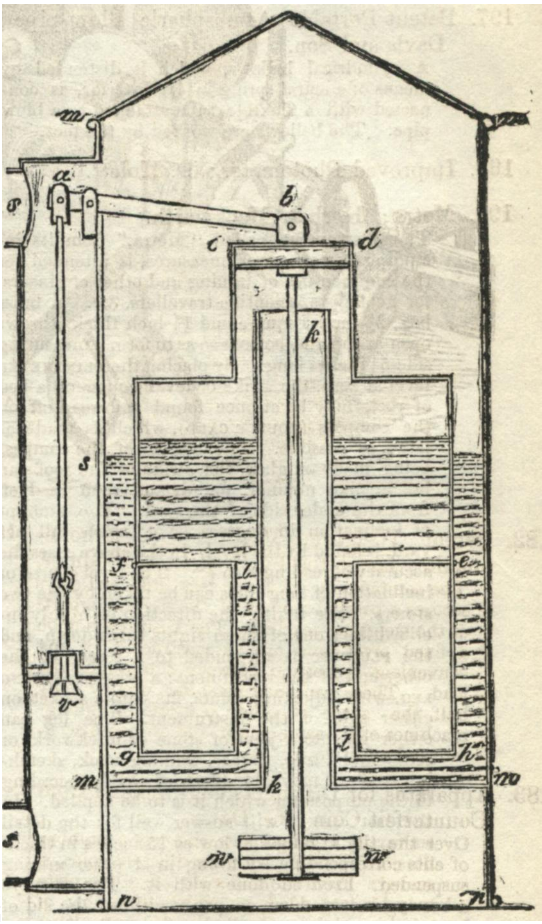
These shades are for consuming gas without a glass chimney, and effecting a saving of 50 per cent. in gas, when compared with the most approved Argand burners, giving at the same time a steadier and purer light. To fit them to the gas-fittings, it is only necessary to unscrew the usual burner, and screw the shade on in its place. Nos. 1 and 2, suited for horizontal fittings. Nos. 3 and 4, for upright fittings. Nos. 5 and 6, for desks, workshops, &c., having a hinge joint, so that the light may be shaded or open.

193. Patent Safety Lamps, for Coal Mines, &c.; F. and W. Whitehead.

These lamps have only one loose joint. They are not liable to accident from blows by the miner's pick or hammer. They cannot be put together so as to be unsafe, and they give ten-fold more light when closed than if opened. No. 1, adapted for ordinary use. No 2, an exploring lamp, which, by the aid of the tube, can be safely used in any amount of hydrogen or carbonic acid gas, and should the pipe be suddenly detached, no accident would result, as the light would simply go out.

194. Mercurial Regulator, for regulating the supply of gas to the burners; D. Hulett.

195. Patent Self-acting Gas Governor; **J. F.** Heather, M.A.



The peculiarity of this invention consists in the admission of air into air vessels sealed with a fluid, such air vessels being supported by floats which the pressure of the gas depresses into the fluid, and by the depression the incoming of the gas is regulated. In the annexed figure, *s s* is the gas supply pipe through which the gas flows passing through the valve *v*, which is connected by means of the lever *a b*, with the float *e f g h*. This float carries the air vessel *c d e f*, open to the external air by the air pipe *k k*, which passes through a tube *l l*, in the centre of the float. The air enters the pipe from the chamber *n n*, in which the balance weight, *w w*, moves; and by varying this weight the pressure of the gas passing to the burners is regulated at pleasure; for when the pressure of the gas in the upper parts of the pipe *s s*, and of the vessel *m m*, tends to decrease, the float rises, and opens further the gas passage at the valve *v*; and when the flow of gas would otherwise be too great for the supply of the burners at the regulated pressure, the increasing pressure on the air vessel depresses the float and closes the gas passage, until the equilibrium is restored. The air, by entering and being driven out through small pipes, checks oscillation in the float, rendering its action steady, and the apparatus offers little friction in action.

196. Wet Gas Meter; J. Gray.

197. Patent Portable Atmospheric Blow-pipe; Davis and Son.

A cylindrical bellows, which is distended by means of a spiral spring in its interior, is connected with a flexible tube attached to a blow pipe. The bellows are worked by the foot.

198. Improved Photometer; D. Hulett.

199. Metra; Herbert Mackworth.

The instrument, called "Metra," from its including a variety of measures, is intended for the common use of mining and other engineers, for geologists, scientific travellers, &c. A brass box, 2¾ inches square and 1¼ inch thick, throws open at top and bottom so as to form a measuring side 5½ inches long. By placing the CLINOMETER level at zero, the strike or level course of a bed of rock may be at once found and read off on the compass (DOUBLE CARD), which is made as large as possible. The bottom of the compass being made of glass, the strike of the roof can be, in like manner, found, and then read off from the under side of the card. The amount of inclination in degrees, or of inches fall per yard, is found by the level. In the above cases the accuracy of reading is to ½°. The level course or inclination of long lines can be taken by the two SIGHTS. For taking the direction of highly inclined lines one of these sights turns down, and the PLUMMET is suspended to a screw at the other end of the instrument; a brass SURVEYING LEG, with adjusting joints, fits into a socket on either side of the instrument. The leg can either go into a joint of stone or brickwork, or screw into a tree, timber, walking stick, sketching stool, or moveable block of wood, according to the purpose for which it is to be applied. In the last case it will answer well for the detail surveying in mines, as low as 15 inches in thickness, all the ordinary filling in of other mining surveys may be done with it. The surveys may be laid down on paper without the aid of anything but a pencil, by first adjusting the north and south line of the plan by the compass, and fastening the paper down by weights. The compass then serves as the PROTRACTOR, and by the scales the distances are measured off. This method saves all calculation, ruling parallel lines, &c., and obviates some instrumental errors. The THERMOMETER needs no remark, but that it is useful in examining ventilation. GONIOMETER.—An arm which can be raised up against the lid enables the eye to measure angles, crystals, cleavage, &c. A MAGNIFYING GLASS is placed in one angle, in the other is a TOURNALINE for destroying the refracted rays of light. It is useful in examining rocks at the bottom of pools, or along coast lines, &c. In the bottom lid is a table of CONSTANTS, suited for the objects of the different classes of persons named. By turning back the elastic band, and lifting out the small arm and sheet of mica, and adjusting the box by the spirit level, a delicate ANEMOMETER without friction is obtained, particularly useful in ascertaining the velocity of the ventilation in the ends of mines. There are several other uses, too long to enumerate, which will suggest themselves in practice.

200. A Folding, Dissecting, or Compound Achromatic Microscope, adapted for travelling or hospital use; S. Highley, F.G.S., F.C.S.

The wood-cuts exhibit the construction of this instrument. Fig. 1 shows the microscope arranged for dissecting animal or vegetable structures. Fig. 2 shows the packing of the lenses, &c. Fig. 3, the instrument folded for the pocket. Fig. 4 shows the arrangement as a compound achromatic microscope.

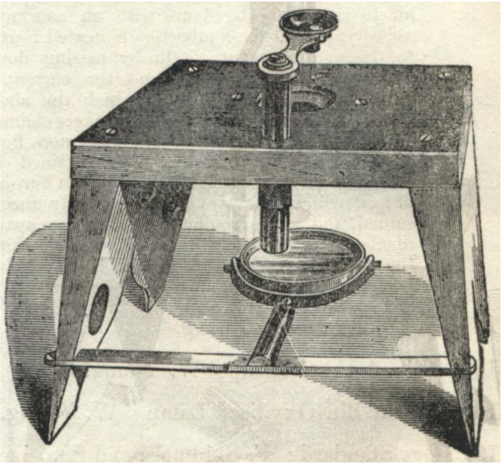


Fig 1.

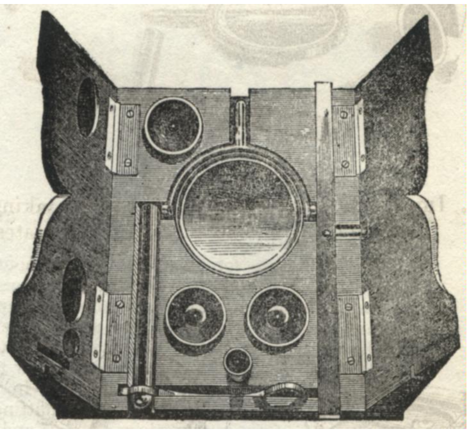


Fig. 2.

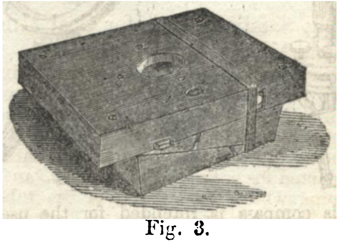


Fig. 3.

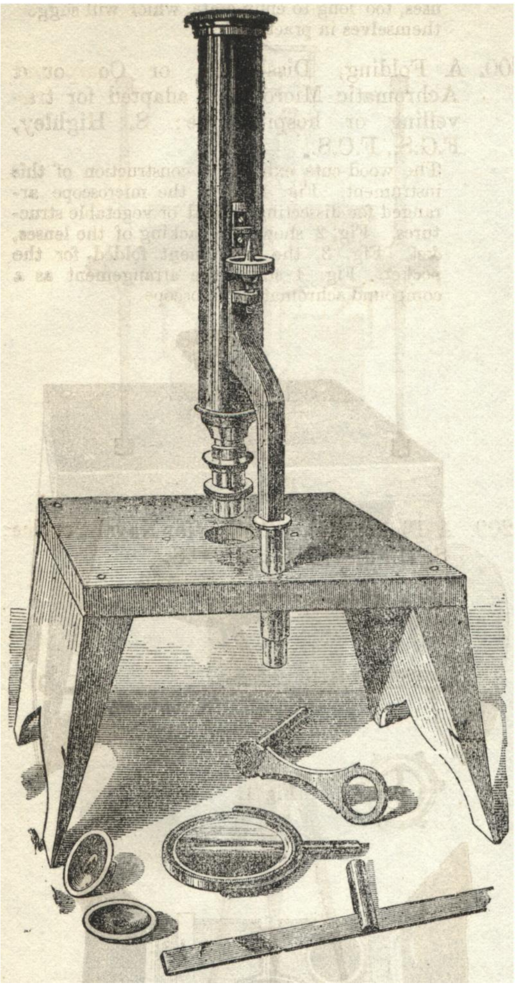


Fig. 4.

201. Improved Prismatic Compass, for taking Horizontal and Vertical Angles; A. Yeates.

Fig. 1.

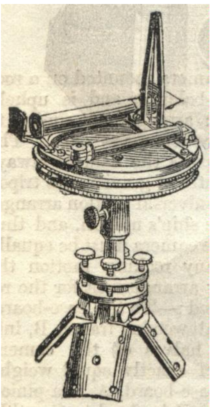
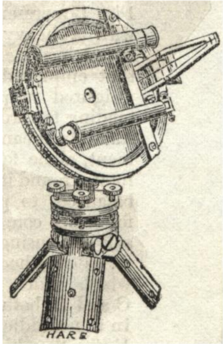


Fig. 2.



This compass is intended for the use of the miner, the surveyor, and the engineer, when both vertical and horizontal angles are required to be taken with speed and accuracy. Inside the compass-box is a silver ring divided to 30′, and this gives the magnetic bearing, even when held in the hand. When placed on its tripod stand, as in Fig. 1, the spirit level is used to level the instrument, when the angles can be taken independently of the magnetic needle, which is of importance in districts abounding with iron. To measure the vertical angles the compass is to be turned sideways, as in Fig. 2, without removing it from its stand; the level then shows the horizontal line, and all angles can be taken from the zenith round, all observations can be verified by reversing the compass in azimuth and altitude.

202. Portable Theodolite; A. Yeates.

203. The Superbola Machine, for striking a newly discovered oval, entitled the Superbola—a form of Curve existing between the Ellipse and the Parabola; J. Augustin Boyle.

This instrument will give to artists a facility for drawing a set of graceful curves for every kind of pattern or design. The proportion of the figure, being mathematically true, will assist with squares, parellograms, triangles, &c. Any description of its oval form can be drawn up to the orange shape. The Superbola Oval will also suit for the arch of skew bridges, being without that dangerous part in the elliptic curve, designated by architects as the "thigh," which renders all oblique bridges liable to fall in when the parts above them become saturated with water. The Superbola, conjoined with another at $\frac{1}{8}$ from its centre axis, gives an area apparently suited for concert rooms, theatres, churches, &c. as the inventor believes it will be found devoid of reverberation, so destructive to hearing.

204. Improvements in Angles, T squares, straight edges, parallel rulers, and other similar instruments employed in drawing; C. T. Guthrie.

205. The Architect's Pocket Companion; F. J. Wilson. Maker, Mr. Adie.

This compact instrument contains a pair of compasses, a level for measuring angles, a penknife, pencil, and ruler.

206. Patent Electrotyped Raised Figures and Electro-Plated Elastic Steel Tape; Cutts, Chesterman, and Bedingfield.

The use of this instrument is twofold, as it adapts itself to either tape or chain. It is made to wind into a case, the same as the oiled tape, and is alike useful in measuring land or other property. The weight of a four pole steel tape, case included, is only one-third the weight of the ordinary chain, and from its elasticity is adapted for circumferential as well as lineal measurement. Every mark, line, or figure, is raised by a chemical operation, so that they become more bright by usage. Should the steel tape become wet, it can be cleaned with a piece of cloth or leather, and can be wound in its case in much less time than the ordinary chain can be folded up. If any accident should occur to any of the divisional lengths of this tape, such lengths can be had to replace them, and can be fastened by the most ordinary mechanic.

207. Patent Photographic Camera, for taking pictures out of doors ; T. E. Merritt.

A dark chamber is made so that it may be attached to the back of the camera. This chamber is filled with prepared papers placed between glass or collodion holders. The first paper is brought forward till it drops on a sliding plate by means of a screw, where it is in focus. After sufficient exposure, the sliding plate is pulled back, when the picture falls into a receptacle below the dark chamber.

208. Perambulating Photographic Field Camera for war or other purposes ; S. Highley, F.G.S., F.C.S.

This instrument, originally designed for war purposes, is adaptable to any photographic process, and presents the advantage of carrying *all* the apparatus required in the field, allowing the same to be *rapidly* moved from point to point, and brought into action by *one person alone.* The annexed drawings show the general arrangement. By the wheels (4 feet diameter), a piston-rod passing through the axle, and a handle hinged to it, which can be clamped at any angle, every motion desired for bringing an object into view is obtained. Fig 1. The camera is here represented as arranged for saccharised collodion, dry collodion, or albuminised plates. The prepared plates drop into groves in the sides of the box that is closed by a sliding lid. This box fits beneath a corresponding aperture in the bottom of the camera, over which is placed a Newton's sliding rod. On the lid of the plate box being drawn back, the rod is pushed down, clamped to the top of a plate, and drawn up into a focus ; after proper exposure the plate is replaced in its groove, the lid closed, and so on with as many plates as this box is made to hold. Fig. 2 shows the disposal of the plate, and chemical boxes, water-can, &c., about the axle wheel. By a modification of Newton's arrangement, the moist collodion process may be employed.

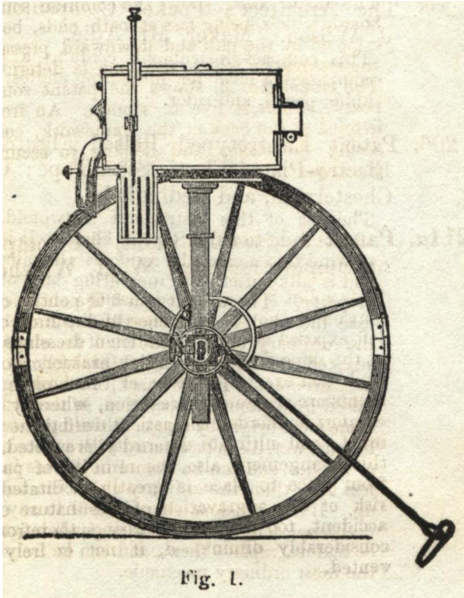


Fig. 1.

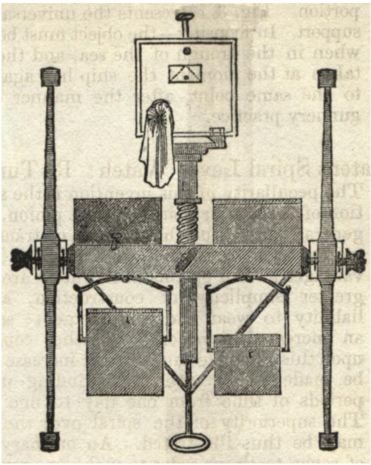


Fig. 2.

209. A Photographic Camera for Naval Service ; S. Highley, F.G.S., F.C.S.

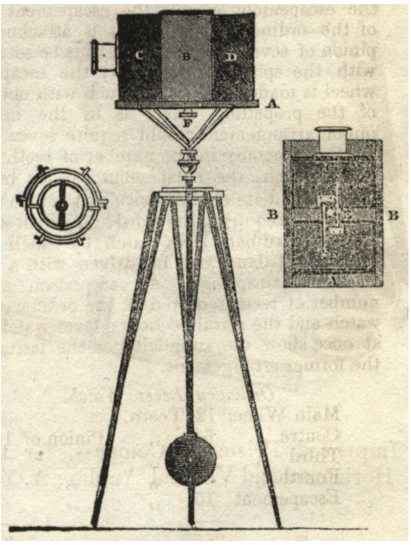


Fig. 1 represents the camera mounted on a rod, with a heavy counter-balance, and is upheld by a tripod stand, on an arrangement similar to that employed for ships' compass-boxes. The weighted rod that supports the camera always tending towards the centre of gravity, the tripod stand, by means of the universal-motion arrangement, alone follows the ship's motion, and thus rotates round it. As the camera must be equally balanced, to prevent any rocking motion the following compensating arrangement for the result of focusing is adopted :—To the base-board, A, is attached a central wooden frame, B, into which slides the two halves of the camera, C and D, both being of exactly equal weight. In the middle of the base-board, A, is a pinion, E (fig. 2), which acts on racks fixed to C and D; it will be seen that by turning the milled-head, F (fig. 1), that the two portions of the camera, C and D, will be brought to, or thrown from, the centre of balance in exactly the same proportion. Fig. 3 represents the universal-motion support. In focusing—the object must be focused when in the trough of the sea, and the picture taken at the moment the ship has again fallen to the same point, after the manner of ship-gunnery practice.

210. Patent Spiral Lever Watch: R. Tunks.

The peculiarity of this invention is the substitution of a worm or spiral for the pinion, as now generally used, for the purpose of transmitting motion from one wheel to another. The advantages gained by this substitution are:—first, greater simplicity of construction, and less liability to wear and derangement; secondly, an increased duration. Watches constructed upon this principle can, without increase of bulk, be made to go with once winding up, over periods of time from one day to one month. The superiority of the spiral over the pinion, may be thus illustrated. An ordinary pinion of seven teeth, in order to make one revolution, takes up seven teeth of the wheel that propels it; while the spiral can be turned one revolution with one tooth of the said wheel, thus effecting a clear saving of six teeth in one revolution. The spiral in this arrangement is attached to the escapement wheel; the escapement wheel of the ordinary lever watch is attached to a pinion of seven teeth; it will thus be seen that, with the spiral arrangement, the escapement wheel is made to effect as much with one tooth of the propelling wheel as in the ordinary pinion arrangement would require seven teeth. By this economy in the number of teeth in the spiral watch, the escapement can be brought into immediate contact with the centre wheel, instead of requiring the third and fourth wheels, as in the ordinary lever watch, by which means a heavier balance can be driven with a much weaker mainspring. A comparison of the number of teeth required in the ordinary lever watch and the spiral 30 hours' lever watch, will at once show the simplicity of the latter over the former arrangement.

Ordinary Lever Watch.

Main Wheel	72	Teeth.		
Centre „	64	„	Pinion of	10
Third „	60	„	„	8
Fourth „	54	„	„	8
Escapement	15	„	„	7
	265			33

240 beats per minute.

Spiral 30 Hours' Lever Watch.

Main Wheel	72	Teeth.		
Centre „	40	„	Pinion of	10
Spiral „	18	„	„	6
Escapement	25	„	With Spiral.	
	155			16

100 beats per minute.

The above figures show a saving of 110 teeth in the wheels, and 17 teeth in the pinions; and in order to equalise the friction on the balance staffholes, so as to make the watch have an equal motion in all positions, it is proposed to make the balance staff-pivots sugar-loaf shape, and the ends of the pivots flat; by this means, whatever position the watch may be in, the ends only of the pivot will be in contact with jewel holes. By this shape of staff-pivot, the objection that has hitherto existed to a slow-train watch is obviated, viz:—the side friction to the staff-pivots being so much greater than that of the end, caused the vibration of the balance to vary in different positions, and consequently the watch to go irregularly. The only condition requisite to cause a watch to go regularly in all positions, is to maintain the same amount of friction under all the circumstances in which it may be placed. This applies especially to the balance staff. In the ordinary lever watch, velocity overcomes this unequal friction. The pivot, as above described, receives the same equal motion in the slow train as is obtained by velocity in the quick train, and with the additional advantage of less wear and tear on the machine. The superiority of the spiral watch is thus evident, in the fewer works and slow train, over the quick action and more complicated arrangement of the ordinary lever. In the spiral lever the escapement wheel becomes the second's wheel, to which the second's hand is attached. The escapement wheel makes two revolutions per minute; the second's hand will, therefore, make one revolution in the half-minute, which will afford equal facilities for counting short periods of time, where the second's hand is required. By taking advantage of the teeth that are saved in the construction of this watch, and disposing of a number in an additional wheel, a watch may be made to go 8, 14, 21, or 31 days, with once winding up, and still not exceed the number of teeth (even in the 31 days' watch) over the number required in the ordinary day lever watch. The principle of the spiral watch will be admirably adapted for drawing-room timepieces. Timepieces with the spiral arrangement may be made to go three months or longer with once winding up, without increasing the number of teeth, which will be a great advantage, requiring less attention, also diminishing the danger of breaking the glass shades with which timepieces are frequently covered, including also less liability to derangement from the less frequent winding up.

211. Patent Suspension Bridge for the Sounding Boards of Pianofortes; W. Shepherd Smith.

The model No. 1, shows the common sounding board, which, being fast at both ends, becomes crippled by the pull and downward pressure of the strings, by which the tone is deteriorated. The model No. 2, shows the patent sounding board, which is free to vibrate. An iron rod is fixed at the back of the framework, counteracting the strain, and helping to secure the glued parts.

211*a*. Patent Adjustable Splint, for Compound or Simple Fractures; W. H. Winchester.

This splint is so arranged that the entire or any portion of the circumference of the limb can be left exposed for the application of dressings, &c.; at the same time that the natural forms of the limb and exact apposition of the broken fragments are accurately preserved, whereby great comfort is afforded the patient during the treatment, and ultimate deformity prevented. By this arrangement, also, the removal of patients from place to place is greatly facilitated, the risk of the aggravation of the nature of the accident, too frequently arising therefrom, is considerably diminished, if not entirely prevented.

AGRICULTURAL IMPLEMENTS AND SADDLERY.

212. Tank and Cesspool Cleansing Machines; W. Dray and Co.

These are made on four wheels as waggons, or on two wheels as carts. Their mode of operation is by means of a powerful air pump attached to the machine, which raised the cess, or other foul liquid without contaminating the surrounding atmosphere with noxious effluvia. The suction pipe (which is flexible, and may be of any length) is carried through passages of dwelling houses, to back premises, or other places otherwise inaccessible without incommoding the inmates of such dwellings. The Royal Agricultural Society of England awarded Messrs. Dray and Co. a silver medal for this invention.

213. Improved Steel Digging Forks; W. Dray and Co.

These forks are superseding the spade for all digging purposes, being light in the hand, and entering the ground with less labour than the spade.

214. Cottage Allotment Subsoil Fork; F. I. Wilson. Made at the Agricultural Implement Department, Baker-street Bazaar.

The handle is bent about two inches to the foot out of the perpendicular to one side, so as to enable the labourer to stand over his work; a small handle is placed at about the usual distance of a spade handle, thus enabling the labourer to guide it into the ground. The hand is then applied to the long lever handle, bringing an almost irresistible power to bear upon the subsoil. The object of this implement is to loosen the subsoil after the spade or plough has gone over the ground.

215. The Double-Handled Spade; F. J. Wilson.

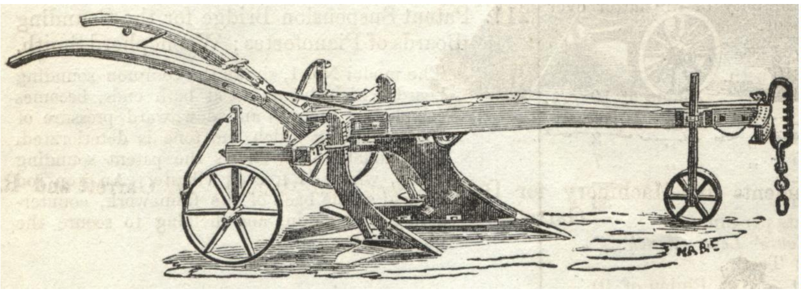
The peculiarity is that a second handle is placed at the base. The main shaft is raised about six inches, and runs parallel to it; its length is about a foot; it is fixed into the handle by a cotter. The advantage is—it enables the labourer to do filling work without bending his back unnecessarily.

216. A Hand Spud, called the "Scorpion Spud;" J. Bailey Denton.

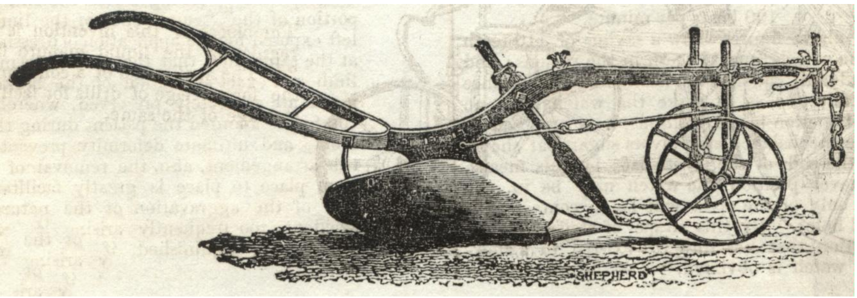
This spud is for killing the root as well as cutting off the heads of weeds by the ejection of destructive liquid on the stump or root of the weed at the time, and by the action of the incision. The principle of distributing liquid to the roots of plants by the agency of the hoe is also applied to the horse-hoe; but in that case the liquid, instead of being destructive, is of a fertilising character, and can be used to all drilled crops, as well as to seeds and permanent pastures.

217. Patent Broad Share and Subsoil Plough; E. H. Bentall.

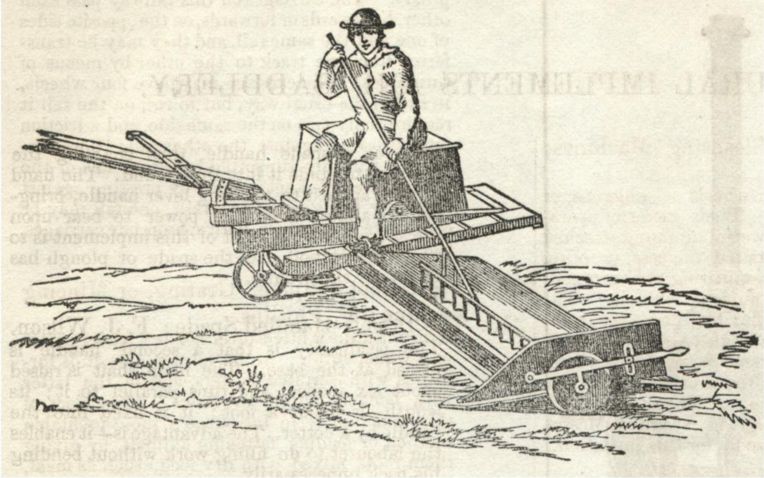
This plough has a long and rigid central beam, and a central frame with a long projecting point; it has also side projecting points; behind these are attached shares of various widths, according to the soil on which it is intended to operate. In all ordinary implements of this character, the breaking up and paring the soil is done in two operations, which in this case is performed in one. The central part can be used as a sub-soil plough.



218. Wrought-Iron Plough; W. Dray and Co.

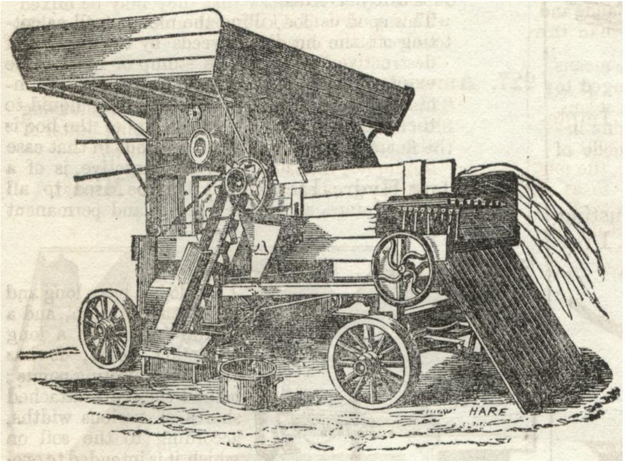


218*a*. Patent Reaping Machine, known as Hussey's improved patent American Reaper; W. Dray and Co.



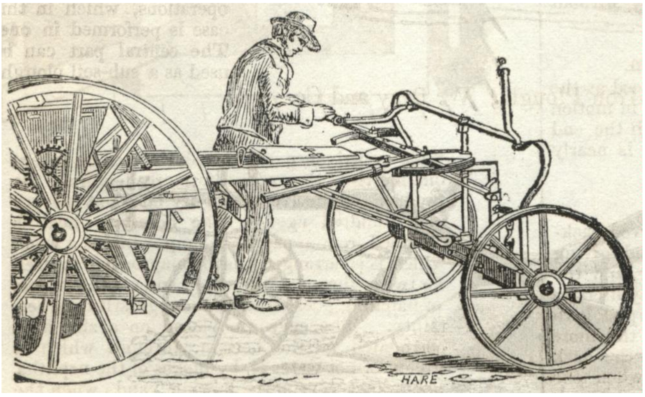
The model shows the recently patented improvements. These consist chiefly of the tipping platform, which delivers the corn in proper condition for binding, and the perforated knives, which prevent the machine from choking when operating on foul or grassy land —an evil to which most other reaping machines are liable. The Royal Agricultural Society of England awarded Messrs. Dray and Co. their prize for this machine.

*219. Patent Improvements in Thrashing Machines; R. Garrett.



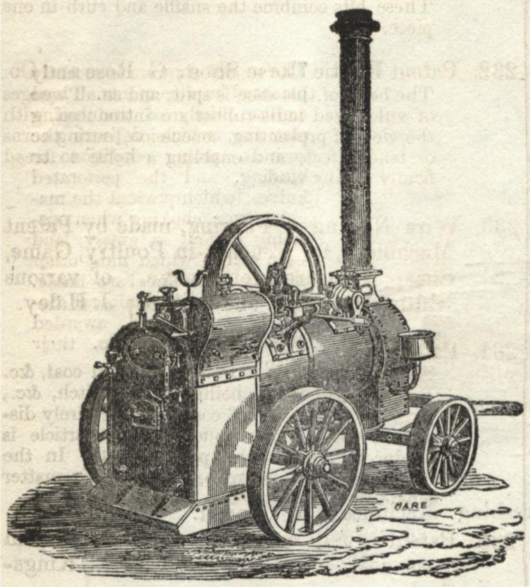
The object of this invention is:—1st. The driving of the axles of the drum of a portable combined thrashing machine. 2d. For the construction and giving motion to the straw-shaker of a thrashing machine.

*220. Patent Improvements in Machinery for Drilling Seed and Manure; R. Garrett and R. Garrett, junr.



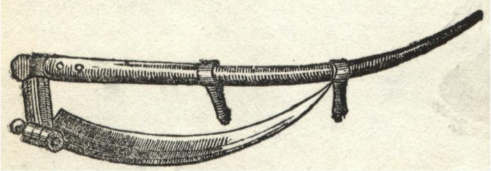
The object of this invention is:—1st. For regulating the liquid manure from drills. 2d. The application of a compound-lever to the forecarriage of drills for facilitating the steerage of the same.

*221. Patent Improved Arrangement of Valves for Working Steam Machinery; R. Garrett, junr.



The object of this invention is:—1st. The means for admitting to such engines, when arranged to work expansively, a continuous supply of steam, and cutting off the supply when the engine has attained its ordinary speed. 2d. The mode of actuating the expansive valve.

222. Patent Double-Action or Self-Adjusting Scythe; J. Boyd. Exhibited by W. Dray and Co.



This instrument is capable of being set, on the instant, to any angle which may best suit the operator, be he amateur, gardener, or agricultural labourer. When out of use it may be shut up like a penknife, and carried away without danger.

223. The Weight Scythe; F. J. Wilson.

The improvement is—a weight is placed at the upper end of the scythe handle; when in motion it will assist the blade working through the end of the swarth when the first power is nearly exhausted.

224. Hedge Slasher; F. J. Wilson.

The improvement is—the blade is curved backwards, thus throwing the weight behind, giving a security and steadiness to the blow, and the curve meeting its work at an angle, may literally be said to shave the hedge. It is sharp at both sides, because the flatter the blade the more power is thrown into the stroke; and the back cutter can be used with advantage when the other is accidentally blunt.

225. Portable Farm Railway; W. K. Westly.

This railway is composed of two horizontal series of rails, the one above the other, connected by vertical pillars. The carriages on this railway pass each other, backwards or forwards, on the opposite sides of one and the same rail, and they may be transferred from one track to the other by means of turntables. The carriage may have four wheels, to run in the usual way, but to run on the rail it requires only two on the same side, and a friction pulley to lean against the other rail. The carriage is partially supported by either one of the rails, while it is kept upright by pressing against the other. Instead of two rails, one rail may be constructed to produce, with appropriate carriages, the same effect.

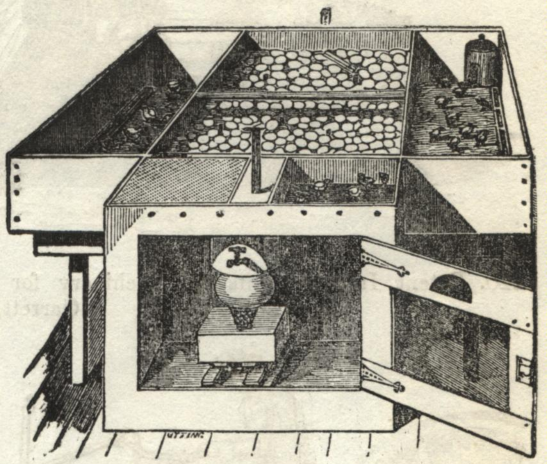
226. Patent Root Pulping, Grating, or Mincing Machine; F. Phillips.

This machine is fitted up either as a barrel cutter or a wheel cutter; in the former case it is furnished with serrated cutters, and in the latter with hooked cutters or claws. The object of this machine is to introduce a more profitable method of feeding fattening animals, by giving them roots mixed with dry food, such as meal, chaff, &c., instead of the old mode of feeding them, sometimes with roots only, and sometime with dry food only. It so pulps or minces turnips or other roots, as that they may be mixed with any dry food, without animals being able to select them out of it.

227. American Churn; W. Dray and Co.

This churn can be had of any size, for churning 3lbs. to 40lbs. It is capable of making butter of the finest quality in about ten minutes.

228. Patent Hydro-Incubator; Carlo Minasi.



This contrivance can be constructed at about one-fourth of the expense formerly required. It produces on the average eighty birds out of every one hundred eggs. The necessary heat is obtained from a naphtha lamp, without a wick, which is so arranged that it may be left to itself for two or three days together, and yet the process of hatching goes on with due regularity and certainty. The eggs are placed on a zinc tray, corrugated at the bottom, through which a stream of hot water is, by means of the naphtha lamp, kept constantly flowing; and, when the chicken comes out of the shell, it is placed beneath the same zinc tray, which now performs the second duty of the artificial parent. After being kept there the proper time, it is removed to a compartment more suited to its increasing strength, and is ultimately placed in a pen in the open air.

229. Horse Muzzle, for Preventing Crib-biting; T. Clowes.

This muzzle is fitted at the bottom, and at the part where the horse's chin rests, with a number of prickers, or sharp points, which are sheathed when not in action by perforated bars, acted upon by springs; but when the animal attempts to bite or suck his crib, or presses his mouth on to anything hard, the prickers are caused to protrude, and, by acting upon the lips or chin of the animal, will effectually cure him of this objectionable habit. This muzzle may be used either with or without the perforated plate, which is temporarily fitted inside, according as the animal is intended to feed or not.

230. Portable Pocket-sized Horse and Cattle Measure; J. Griffiths.

This measure is half-pistol, half-spyglass, in form. The tube end draws out when fitted for use, like a spyglass. It is contained in a case, 7 inches by 4 inches. The inventor thinks it would be found very useful in the hands of tax-collectors in assessing animals.

231. Patent Safety Lever Bits, adapted for Carriage, Hunting, and Hackney Uses; J. Griffiths.

These bits combine the snaffle and curb in one piece.

232. Patent Elastic Horse Shoe; G. Ross and Co.

The back of this shoe is split, and small wedges of vulcanized india-rubber are introduced, with the view of preventing concussion, curing corns or tender feet, and enabling a horse to tread firmly on any road.

233. Wire Netting or Fencing, made by Patent Machinery, for Fencing-in Poultry, Game, Sheep, Pleasure-grounds, &c.; of various widths, strengths, and meshes; J. Haley.

234. Patent Fuels; Gwynne and Co.

Samples of fuel made from peat, small coal, &c. By these patents the boiling of tar, pitch, &c., in the manufacture of coal fuels is entirely dispensed with, and a much superior article is produced, at half the present cost. In the compressed peat samples, no adhesive matter whatever is used to make them adhere.

235. Patent Fuel, made by machinery, from peat, coal, and other substances; C. Kingsford.

MISCELLANEOUS, INCLUDING ARTICLES FOR PERSONAL AND DOMESTIC USE.

240. Patent Process for Covering Pills (with Resinous Gums), rendering them Tasteless; A. H. Cox.

The process is applicable to all pills. The pills are coated with a thin film of resinous gums, which are insoluble in water or saliva, and consequently tasteless; but the coating, after a short immersion in water or the stomach, is detached. The pills are dusted over, before they are quite dry, with any innocuous white powder.

241. Impermeable Bibulous Lamb-skin; Dr. Scott Alison.

For wounds and tender surfaces, for the application of water and liquid medicinal agents, such as aconitina, morphia, &c., in solution; mineral waters, &c.; securing their continuous presence by preventing evaporation, through the medium of an agreeable, light, elastic and adhesive substance.

242. Impermeable Bibulous Lamb-skin, Perforated; Dr. Scott Alison.

Having the advantages of the Impermeable Bibulous Lamb-skin, with the additional advantage of permitting the escape of discharge when that is very copious; and of somewhat reducing temperature by permitting a certain amount of evaporation.

243. Impermeable Bibulous Lamb-skin, covered with Black Silk; Dr. Scott Alison.

For ornament when applied wet to the face, &c. May be used dry, or made into muffs, &c., as a preservative of the animal heat, in rheumatism and cold extremities.

244. Ice Bag of Impermeable Bibulous Lamb-skin; Dr. Scott Alison.

For the application of ice and cold water to the head in fever, delirium, &c.; securing a low temperature, and by means of its impermeable coating preventing the trickling of water; and by minute perforations admitting just so much permeation as will keep the outer and bibulous surface in a state of continuous wet. The surface of the wetted skin is exceedingly grateful to the patient, and completely obviates the hardness of ice, when simply contained in muslin, as heretofore.

245. Transparent Impermeable Lamb-skin; Dr. Scott Alison.

For the spreading of plasters. Used as a waterproof bed guard. It is light, transparent, partially elastic, and, unlike oiled-silk, offers a surface capable of holding plaster.

546. Transparent Impermeable Adhesive Plaster; Dr. Scott Alison.

Spread upon the Transparent Impermeable Lamb-skin; it is waterproof, and, without deterioration, admits of the use of the bath. The condition of a wound may be seen through it and its outer surface may be washed upon the patient without detaching it, in this respect unlike ordinary plaster. If necessary it may be perforated to admit of discharge. Is warmed for application.

247. Impermeable Lamb-skin Isinglass Court Plaster; Dr. Scott Alison.

Perfectly waterproof, and softer than ordinary court plaster, the hard edges of which press into the skin and excoriate it.

248. Impermeable Lamb-skin Resinous Court Plaster; Dr. Scott Alison.

Suitable for cuts on the face and hands, and possessing more binding power than isinglass.

249. Sulphuric Acid Obtained from Gypsum (Sulphate of Lime), and Rectified or Distilled in an *Iron* Vessel; R. Von Seckendorff.

250. New Mineral Colours; Emile Kopp. Exhibited by Steiner, Gotty, and Co.

The four samples of colours are combinations of sulphur with antimony, and contain no organic colouring matters. They resist the action of sun, air, and rain, without sustaining any alteration. They also remain unaltered when exposed to the action of sulphuretted hydrogen and diluted acids or alkalies; only strong mineral acids and alkalies will injure them. They are very voluminous, and when the weight is compared with other mineral colours, their colouring power will be found very great. The price at which they can be manufactured is moderate, being from 1 to 2 shillings per pound, according to the shade.

251. Indian Corn Starch, manufactured by a patent process; J. Polson.

No. 1. Ungranulated Starch, (which requires to be boiled), obtained by mechanical separation of the gluten and fibrous matter, without fermentation, or any chemical agency. No. 2. Granulated Starch, (which requires to be boiled), obtained from No. 1 by purifying it by means of caustic alkali. No. 3. Granulated Starch, (which does not required to be boiled,) forming a thick gummy mucilage, similar to *dextrine*, by pouring boiling water over it. This starch is produced by subjecting No. 2 to the action of an acid. No. 4 Meal, consisting of gluten, starchy fecula, and fat, obtained in the process for No. 1. Also Biscuits, composed of two parts of wheaten flour and three parts of this meal. No. 5. Husk and Fibrous Matter, which is also obtained in the process for No. 1. This is highly nutritious food for cattle. No. 6. Starchy Flock, obtained in the purification of No. 1.

252. Patent Argentine, a new Metallic Dye; E. Schisekhar and Prof. F. C. Crace. Exhibited by Akroyd and Son.

253. Improvement in the Printing of Ornamental Fabrics; Patent Double-sided Printed Fabrics; N. M. Caralli.

This invention relates to the manufacture of fabrics of the Zebra class, such fabrics being suitable for all the purposes to which ordinary Zebra goods are applied, with the advantage that they present a different and totally distinct pattern or device on each side. A plain, twilled, or other fabric is used as the material for producing this duplex pattern. Such fabric is printed with the distinct pattern or device in the Zebra or similar style on each side of the cloth, so that one piece shows two dissimilar styles of ornamentation.

254. Improvements in the Production of Surface-Finish, called Watering and "Moiré Antique;" J. W. Crossley.

255. Patent Marsh Mallow and Hollyhock Rope; J. Niven.

The inventor has patented the application of various fibres for the manufacture of paper and textile fabrics.

256. Patent Excelsior Reel; J. P. Clarke.

Heretofore, in the manufacture of reels, they have been solid, and not capable of being seen through—hence the barrels have been often made of large dimensions, and the reels have contained short measure, and the purchaser has had no means of ascertaining that fact until the cotton or thread had been unwound. The improvements consist in making the reels and ends of reels with holes or openings through, in various styles, so that the extent to which the interior of a reel is wound may be seen through the end or ends of the reel, by which fraud will be prevented.

257. Patent Fluted Down Quilt; T. Lawes.

These Quilts supersede all other bed covering: as compared with the best quality of blankets, they produce as much warmth with less than half the weight, and do not cost more.

258. Patent Cement for Leather, as a substitute for stitching; the Patent Leather Cement Company.

The following are the specimens exhibited:—Nos. 1 to 4—Machinery belts. No. 1—The leather prepared for the cement. 2—The leather prepared with *one* coat of the cement. 3—The leather prepared with two coats of the cement. 4—The belt finished. 5—A fur skin joined with the cement. 6—A piece of water hose pipe. 7—A boot repaired; on one side, the patch in process, the leather prepared ready for the application of the cement; the two pieces to be joined together while the cement is wet; after a minute or two the patch will be finished and show as on the other side of the boot; this boot had been partially footed with the cement and worn out. 8—A Wellington boot, without a stitch; it is altogether cemented, and water-tight $\frac{3}{4}$ of an inch from the sole, and could be made water-tight all over, with a coating of the cement inside. 9—A piece of harness or trace, made without sewing. 10—A bottle of *the cement.*

259. British Shoes and Overshoes; J. Sparkes Hall.

260. Fleecing Gloves, with a thread of one fabric, and another fabric outside; S. S. Stallard.

261. Patent Patriotic Gloves; R. B. Cooley.

262. Mecanique Bonnet; Mrs. C. M. Hill.

This bonnet is made with a drawn front upon a metal frame, the frame being capable of extension so as to form a sun shade.

263. The Caspiato, or Folding Bonnet; J. and E. Smith.

It is packed in a case only one inch and a half deep, thus dispensing with the ordinary bonnet-box; this portability is obtained without in any way interfering with the appearance of the bonnet, which may be made of any of the materials usually employed, and may be trimmed in the highest fashion, agreeable to the taste of the wearer, neither is the cost enhanced.

264. The Socket-hinged Parasol Stick; — Jacobs.

The improvement on the old plan is that the socket is stationary, the hinge being moveable. It has simply to be pulled up and then falls.

265. Patent Safety Brooches; Berkeley W. Fase.

In this brooch the pin slides upon an oval frame, and drops into a groove made to receive it after insertion in the dress, and from which the pin cannot escape until it is raised by the finger from underneath, and the oval frame turned round to the largest diameter of the oval, when the pin drops through and the brooch is undone.

266. Patent Cylindrical Brooch Protector; R. Restell.

267. Patent Suspending Ever-pointed Pencil; J. Butler and Co. Exhibited by E. Nash.

This Pencil is intended to prevent the heads and points getting unscrewed and lost. It contains within the head a clip, which holds the lead and prevents the head from being detached from the body of the pencil case.

268. Printing from Nature, to produce Imitations of Ornamental Woods; Felix Abate.

The fact of the extreme sensitiveness of vegetable substances under the joint action of acids and heat, having attracted the attention of M. Abate, he entered upon a series of experiments, which showed that a small quantity of acid, and an instantaneous application of heat, were sufficient to produce striking effects. The process is as follows:—Suppose a sheet of veneering-wood be the object from which impressions are to be taken; the wood is exposed for a few minutes to the cold evaporation of hydrochloric or sulphuric acid, or it is slightly wetted with either of these acids diluted, and then the acid is well wiped off from the surface. Afterwards it is laid upon a piece of calico, or paper, or common wood, and by a stroke of the press an impression is taken, which is, of course, quite invisible, but by exposing this impression, immediately after, to the action of a strong heat, a most perfect and beautiful representation of the printing wood instantaneously appears. (See *Journal of the Society of Arts*, Vol. II., p. 539.)

269. Waterproof Paper, for Lining Damp Walls, &c., and for Packing-Cases, instead of Tin; T. Furse.

The joint is made waterproof in this specimen by means of a heated flat-iron run along, causing the cement to ooze out.

270. Patent Graining Instrument, for producing instantaneous imitations of Woods and Marbles, either on paint work or plain deal or other woods; I. Bellamy.

By this invention a great saving of time is effected, and inferior workmen are enabled to produce first-class work. The deleterious and prolonged process of painting is superseded, and the natural grain of the deal wood is preserved, and made to produce, in connection with the graining colour, an imitation of the desired fancy wood; and by the aid of varnish, a face is given to the work equal to that obtained by the use of oil paint.

271. Specimens of New Oak Stained with Writing Inks; J. Hawthorne.

By this process the wood is stained without filling up the grain, and the colour cannot be chipped or knocked off by a bruise or scratch, as the dye sinks into the wood. No previous preparation is required, and a boy, with a flannel and pail, can stain many feet of work in a day at a small cost. Any shade of colour can be produced by a mixture of yellow, black, red, and violet inks. The specimens exhibited are stained and slightly oiled, but they could be varnished or French polished without injuring the colour.

272. Ornamental and Coloured Glass; Tony Petitjean. Exhibited by E. Rascol.

The merit of this invention consists in the cheapness of the manufacture, the various shades of this glass being obtained at a less expense than for a single drawing—by simple block-printing.

273. Pulp made from waste newspapers, chemically purified of printers' ink; C. M. Archer.

274. Envelopes; J. J. Aston.

In these envelopes the tongue of the seal flap enters a slit in the other three flaps, and is folded back upon itself, the gummed underside of the tongue being made to adhere to the insides of the four flaps.

276. Patent Portable Letter Copying Press; G. B. Goodman.

By one simple action, which requires hardly any exertion, a pressure of upwards of 3 cwt. can be obtained, and as perfect an impression will be produced as by any other copying press now in use. It is acted upon by a vertical lever, with a camb-like head, there is no necessity to have it fixed, or to go to the further cost of having stands made for its support, but it can be used upon a desk, table, &c., &c., and removed from one office to another.

277. The Post-Office London Directory for 1855, showing the Application of Colour to the Edges of Books; J. and J. Leighton.

278. Patent Mechanical Letter, Invoice, and Music Binder; G. B. Goodman.

A metal case placed within the back of the cover, contains springs which act upon a metal binding rule. This rule runs along 3, 4, or 5 binding needles, and in groves cut in the case. When a paper has to be filed, the binding rule is drawn to the right-hand edge of the case, where it is retained by a catch. The papers to be filed are then placed between the binding rule and the needles, and the catch being released the binding rule is pressed by the springs in the case.

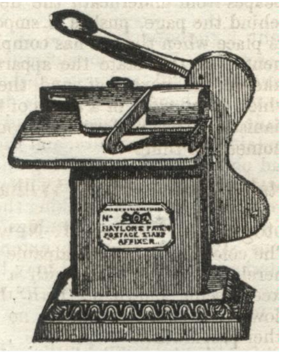
279. Elastic Bands; T. H. Ingall.

280. Sand Glass, which records its having run out by Striking a Bell; F. Le Mesurier.

281. Patent Letter Clip; G. Ayres. Exhibited by E. Nash.

This clip consists of a vertical spiral spring attached to a stand. The letters are inserted between the coils of the spring.

282. Patent Postage Stamp Affixer; Naylor and Meeks.



This consists of an upright metal box, in which are two reservoirs, one occupied by a sponge well saturated with water, and the other containing a supply of 120 postage stamps. The letter is first pressed under a roller, which brings it in contact with the sponge, and moistens the corner; it is then transferred by a slight lateral motion to the stamp box. The depression of a small lever brings up the box to the required point, and at the same time affixes a stamp on the letter.

283. Registered Pocket Stamp Box and Damper; H. M. Naylor.

This is constructed to hold 20 stamps, the first of which is inserted in the slit in the roller when the whole strip is wound round the roller, a portion of the last stamp remaining on the thumb-plate. In practice one stamp is withdrawn, torn off, and placed on the damp sponge, when it is ready for the purpose required.

284. Postage and Receipt Stamp Damper; A. G. Barham.

285. Patent Printing Types, cast by machinery; J. R. Johnson. Exhibited by J. H. King and Co.

286. Patent Suspension Reading Desk; J. Hammond.

This desk enables the reader to place the book in such a position, that it may be read with ease in a reclining or recumbent position, either on a bed or couch. It is, however, equally applicable to a perfectly erect position on a chair, and the reader need not lean forward as is sometimes required when the book is on the table. It can be attached to any ordinary table.

287. Patent Magnetic Music Page Turner; Druce and Co. Exhibited by G. B. Goodman.

This invention consists principally of a light lever, or rod. which is centered over a frame under the ledge of the reading-desk. At the extremity of the rod is a magnet, and a small disc of iron is fitted by points into the lower corner of the right-hand page of the music. By acting upon a pedal in connexion with the lever, it is thrown over to the right hand side, and the magnet drops upon the iron disc. with which it remains in contact by virtue of the magnetic attraction. On releasing the pedal, the lever moves back to its ordinary position on the other side of the book, the magnet drawing the page with it. At a certain point of the position, a small stem, attached to the lever by a spring, escapes from underneath the desk, and getting behind the page, pushes it smoothly down into its place when the rod has completed its movement. In this state the apparatus is ready to take up the next leaf, and the entire process, which is the work of a touch of the pedal by the pianist or other performer, is completed in a few moments of time.

288. Portable Easel; H. T. Williams.

289. Photographic Colors; J. Newman.

The colors are in an impalpable powder, and are merely to be laid on with a soft brush, the excess being blown off with the India-rubber blower, the plate requiring no breathing on or other preparation.

290. The Umbrella Camp Stool; F. J. Wilson.

291. A Machine for Setting Drawings; F. J. Wilson.

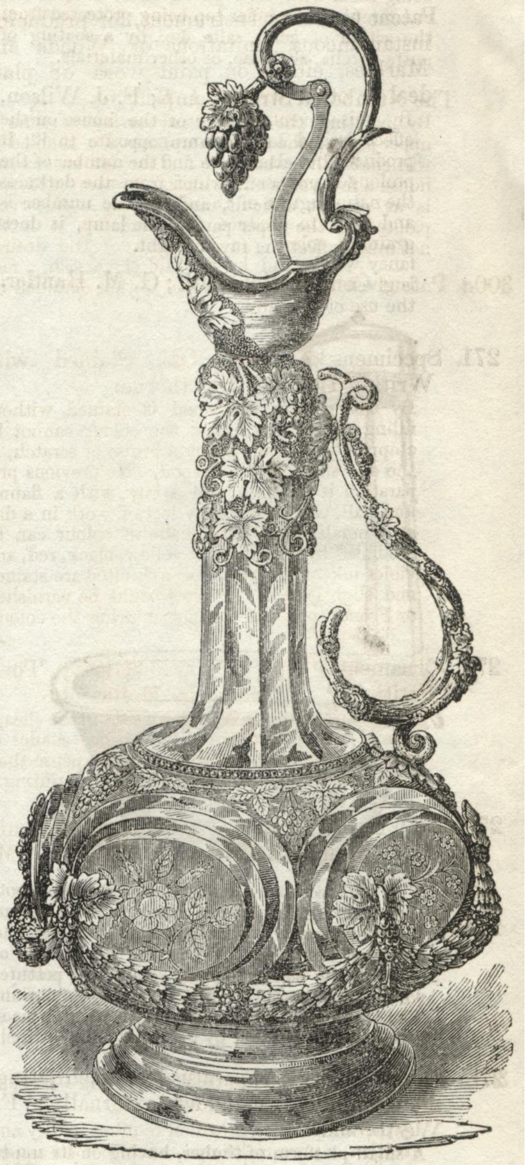
292. Application of Photography for readily producing perspective representations of Carriages—to scale if required—1st specimen coloured; 2nd untouched; Hooper and Co.

293. The In Statu Quo Chess Board; I. Jaques, jun.

In this invention, by pressing a pair of small buttons on the outer rim of the board, the pieces are secured firmly on whatever squares they may happen to be; while a counter pressure on a button on the inside immediately releases them.

294. Patent Self-acting Balance Wine Decanter; T. Challinor.

The following advantages are claimed for this decanter :—1. That the opening and closing are effected without the aid of springs. 2. That by means of the reservoir formed by the covering of the lip, a certain and regular stream of wine is obtained, and the danger of overflowi
reason of a too elevated or rapid moveme
the decanter prevented. 3. That the
required in pouring from an ordinary deca
is reduced by the use of a balance-han
the position of the handle being such as to g
the bottle a tendency to fall into its position
pouring.



295. Self-Acting Tie for Mechanical Straps, or other Similar Purposes; E. Rascol.

296. Pocket Watch and Purse Protector; G. North.

297. Patent Permanent Cap Stopper; R. Pinkney

298. Patent Syphon Ink Bottles; R. Pinkney.

Patent Air-tight Stoppers; W. Young.

b Caps and Stoppers to Bottles; W. Young.

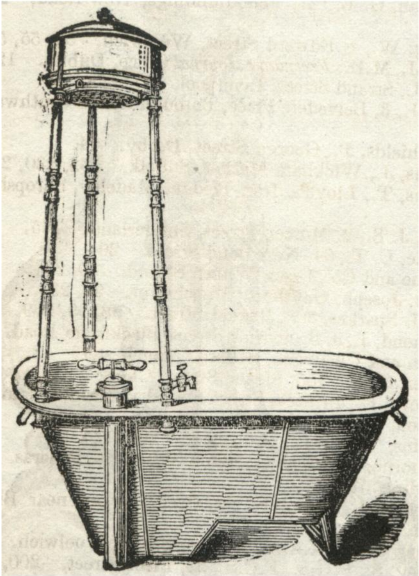
. Patent Permanent Capsules, for Bottles, &c.; Cooke and Crawley.

The peculiarity in this capsule consists in its being lined with cork on its inner side or circumference; the inner top being protected from the action of acids, salts, &c., by a coating of gutta percha, shell-lac, or other materials.

300. The Numbered Street Lamp; F. J. Wilson.

By painting the number of the house on the upper part of the street lamp, opposite to it; it will enable the cabman to find the number of the house a few yards off, which from the darkness is at present difficult, and as the number is painted on the upper part of the lamp, it does not much affect the rays of light.

300*a*. Patent Combination Bath; G. M. Hantler.



This bath combines a warm, shower, hip, foot, and sponging bath in one article. For a warm bath less water is required than those of the ordinary kind, and it has the advantage of enabling the bather to preserve a sitting posture, which is preferable for the purposes of ablution. The bath can also be constructed with furnace attached to be heated by gas or by ordinary fuel.

301. Patent Safety Apparatus for facilitating the cleaning of Windows externally; F. Westbrook.

A small platform of timber, having on its upper surface a metal chair-like framework, is supported outside the window by means of claws and screws.

302. Apparatus for Suspending Looking Glasses; Mrs. Williams.

303. Patent Cramp Screw, for Swing Looking Glasses; J. Beall.

In this invention the binding screws are connected by means of a stiff wire, which passes through the standards and behind the glass.

304. Patent Portable Perambulator, for Children; C. Burton.

305. Patent Pinerium or Aerated Sarsaparilla; T. W. Gibson.

306. Compound of Chocolate, Cocoa, and other Ingredients, for Breakfast and Occasional Beverages; Jesse Ross. Manufactured by Ross, Brothers, and Co.

307. The Sickbed Signal for the totally Helpless; and the Invalids' Bell and Whistle Stand; a Lady, S.S. Maker, G. Southern.

To an upright standard is attached a moveable arm, at the end of which are fixed, 1, a bell-pull—the bell itself being suspended on the top of the standard—2, a whistle, and 3, an elastic tube, having a whistle end.

308. Patent Safety Night Lamp with Alarum combined; E. Simons.

309. Opaque Glass and other Tubes, for Shaving Soap, Brushes, and Dressing-Cases; — Shipley.

310. Registered Tooth Brush Guard or Case; Gay and Son.

This is an anti-corrodible metallic case, enclosing the head of the tooth brush, without the handle, thereby keeping the brush thoroughly clean, and preventing it from coming in contact with any articles among which it may be placed.

311. The Sponge-bag Dressing Case; F. J. Wilson.

312. Improved Bedsteads for Hospital Use; H. Lawson.

313. The Crimean Teapot; F. J. Wilson.

This compact compendium contains a complete breakfast service, consisting of 32 different articles.

314. The Elongated-hinge Dispatch-box; F. J. Wilson.

By this improvement, the writer is enabled to draw away the lid from the desk, thus enabling him the better to get at the ink.

315. The Rapid Letter-directer; F. J. Wilson.

316. The Note-paper Envelope; F. J. Wilson.

317. The New Shooting-hat; F. J. Wilson.

318. Patent Self-Adjusting Wicket, for Cricket-playing; T. C. Yates.

The advantages of this wicket over the common stump are as follows:—1st. The great saving of time and trouble to the umpire, in having merely to place the bail, as the stumps immediately adjust themselves at whatever point they may be struck. 2nd. The stumps are so sensitive, that the bails fall upon the slightest touch of the ball. 3rd. The great saving of the ground as the stand upon which they are fixed into the ground, has no occasion to be removed from the beginning to the end of the game.

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